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The SCIENCE *of* HUMAN BEHAVIOR

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PSYCHOLOGY SERIES ✦ ALBERT T. POFFENBERGER, EDITOR

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TO THE FRESHMEN OF
COLORADO STATE COLLEGE
OF EDUCATION

PREFACE

This book has grown out of an attempt, during the past ten years, to bring together the material about human behavior that will most satisfactorily answer the questions that young adults ask about themselves and about those they know. It has been my experience that more than any logical and systemic treatment of human behavior in the abstract, there is need for a direct approach to an understanding of the why and how of everyday behavior. Young adults have learned many things about human behavior before they enroll in their first course in psychology, and this book is intended to enable them to consolidate and systematize the knowledge they already possess as much as it is to furnish them with new information.

My chief aim has been to present a generalized account, on the college freshman level, of the factors governing human behavior, with a view to providing the readers with simple explanations, in terms of natural law, of the phenomena of everyday experience. Thus, although these explanations are based upon scientific principles, abstruse, technical terminology has purposely been avoided.

The chief question in the course out of which this book has grown has been, "How do we get that way?" I have attempted to supply an answer to this question that will presuppose neither an exceptional aptitude for dealing with abstractions nor any previous formal study of psychology. I have tried to go on from the point where the reader's previous observation and thinking about human behavior has taken him and at the same time to furnish him with the basis for further systematic generalization. By this means it is hoped that better prediction and greater control of human behavior can be made possible to the thoughtful reader.

In assembling and organizing the material I have deliberately departed from the traditional outline of texts in general psychol-

ogy. In a very real sense the book is intended to be a sampling of the various fields of psychology and a means of orienting the reader to the whole field. For this reason it cuts across the entire psychological area; but, because of the limitations imposed upon a book that is to serve as a text in college courses of one semester or quarter, it has had to confine itself to those topics most necessary to the accomplishment of its aim.

The illustrations, both verbal and pictorial, are drawn chiefly from human rather than sub-human experience. The exercises are intended to be merely means of assuring further application of the principles discussed elsewhere in other instances of common human experience. The references have been chosen primarily for their interest and their general appeal.

I am indebted to many persons for suggestions and criticisms which are largely responsible for whatever merit this book may have. Additional experience and more numerous criticisms might have resulted in further improvement of the book; I must, however, accept the responsibility for its present form and for any errors and inadequacies it may have.

I am particularly indebted to President G. W. Frasier for making it possible for me to put my ideas into practice in such a course as this book represents. I am indebted also to Professors Robert Davis, Thomas Howells, Karl Meuensinger, S. L. Crawley, W. R. Griffith, and E. R. Guthrie, and to Mr. Fred Couey, for reading the manuscript in whole or in part and for the criticisms they have offered. I am also greatly obligated to the Misses Ferree and Smith for the hours of painstaking effort they have given to the details of the several revisions of the manuscript.

I deeply appreciate the kindness of several publishers whose willingness to permit their publications to be quoted is acknowledged elsewhere. I am also indebted to numberless investigators and writers whose works have furnished the basis for many of the statements in the book. In a certain sense, little of this material can be said to be my own. I freely acknowledge my indebtedness to others for much of the content and I willingly accept the responsibility for its organization and presentation.

Finally, I am obligated to the many classes of freshmen at Colorado State College of Education who have used this material in a preliminary form and whose criticisms have done much to give this book such value as it may have.

WALLACE T. WAIT

Greeley, Colorado
May, 1938

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THE SCIENCE OF HUMAN BEHAVIOR

Chapter 1

AN INTRODUCTION TO THE STUDY OF HUMAN BEHAVIOR

What Is Psychology?—Psychology has been defined and described in many ways. It is likely to mean something very different for the "man on the street" than for the student who has undertaken even an elementary study of this science, while for the advanced student it is to be expected that the definitions might well be refined still further to show more distinctly some of the subtle shades of meaning of the word.

For the reader of this book, who is presumably approaching a study of the science of psychology for the first time, the definition must be one that will indicate clearly the nature of the knowledge which the field includes. It must divest the term "psychology" of the mystery with which it has been surrounded in the advertising matter of the quack, who employs it as a means of arousing the interest of the public and, at the same time, of hiding the real motives and methods of procedure he is using. It must also avoid the highly technical points of discussion that are of interest chiefly to the advanced student and the professional academic psychologist. In other words, this preliminary statement must be one that makes common sense to the beginning student.

Psychology, then, may be defined as a systematic study of the behavior of the individual member of a species for the purpose of predicting and controlling such behavior. In this book the essential concern will be with human psychology, and wherever the term "psychology" is used it will be thus limited in meaning, except in such instances as the behavior of lower animals shall be specifically included. By the term "behavior" will be meant anything that the individual does as a whole person. This will include not only the responses which can be readily seen by an observer, but also those subtle responses that in everyday language go by

such names as perceiving, thinking, sensing, and imagining. A brief examination of some of the typical problems that confront the psychologist will give a clearer idea of the wide variety of behavior included in this field of study.

What Are Some of the Types of Problems of Concern to the Psychologist?—In each of the several problems selected to show the full extent of the meaning of psychology, there are two ways in which the psychologist might appropriately approach his subject. One of these is frequently called the theoretical approach. The psychological investigator or observer who chooses this method seeks to answer all possible questions concerning the behavior involved, such as: which organs are affected, what caused the response at all, and similar questions centering in an investigation of the nature of the behavior itself.

The other method of approach is sometimes called the practical or applied, because it aims to study the problem in terms of its immediate importance in a practical life situation. The "applied psychologist" has to do with that part of the whole problem which makes the most direct appeal to popular interest, but he would be helpless if he did not have available to him the results of the studies made by the psychologist who has followed the first of these two lines of approach. In each of the psychological problems listed below, both the theoretical and the applied aspects will be emphasized in the statement of the problem as well as in the brief discussion. Some of these problems are now fairly well solved. Others still await further investigation.

1. How much change in the intensity of a stimulus is required to produce a change in the response made to it? Does the intensity of pain double if the voltage of an electric current applied to the skin is doubled? How much will efficiency in a factory be increased if the intensity of the lighting is doubled? What should the intensity be to produce the maximum of efficiency? Can the psychologist help solve this problem?

2. How long after a stimulus is applied does the response get started? More practically, why do so many automobile accidents occur in the which the driver strikes a pedestrian who steps into

the lane of traffic immediately ahead of the car even when the speed is low and the brakes are good? A certain taxi-cab company wished to reduce the number of accidents that had accumulated on the records of some of the men it employed. If it could determine before hiring and training its drivers which ones would most probably have accidents, it could reduce the number of these mishaps. The company secured the services of a psychologist who devised means of measuring applicants' *reaction time*. By refusing to hire those whose reaction time was slow, the company greatly reduced its number of accidents.

3. What are the characteristics of differences among individuals when compared on the basis of any given trait? How valuable would the answer to such a question be to the merchant or buyer concerned with the sizes and styles of merchandise? Of even greater importance to the reader, individually, is the question of the selection of a suitable vocation. Such a problem can be more intelligently solved by the person who knows the characteristics of individual differences.

4. What are the psychological conditions that determine how learning takes place? A very practical problem for any student is that of how to make his or her learning more efficient. In the factory, too, the manager is very much concerned with employing those who can learn most readily to do the assigned tasks for which they are hired. How can the employer know whom to hire? One psychologist was able to devise tests for predicting how rapidly and how well the applicant could learn to perform the required task.

5. What takes place in the mind of the thinker who is solving a problem in mathematics, in social etiquette, or in bridge construction? Would a knowledge of the essential processes involved in thinking enable the reader to do a better job of problem solving?

6. Why does a baby not learn to walk before he is about one year old? Why is it not profitable to try to teach the average child to read before he is about six years old? Would the teacher who knew how bodily structure and behavior developed be able to determine more wisely the type of school activities to be employed?

7. Why are men of eminence, such as those listed in *Who's Who,* so much more likely to have relatives also listed in such a book than those who are not of sufficient distinction to be included? What makes many behavior traits common to several successive generations of certain families? Why do such undesirable traits as delinquency and insanity often run in families? Are the answers to such questions important in choosing the person one is to marry or in determining the kind of environment in which to rear one's children?

8. What sets behavior into action? What is the nature of the drives or urges that compel people to do things? Would one have better success in trying to control the behavior of oneself or of others if one knew the nature of such drives? How can one sell oneself in getting a job? Which appeals will be most effective in selling a car and which in selling a package of breakfast food?

These are only samples of the limitless problems of predicting and controlling behavior. The reader will be able to add to this list indefinitely. It should also be evident to him by this time that there is a very great deal that is of practical value in the study of psychology, but it must be remembered that before the practical applications can be made, the underlying principles must be understood.

In this connection another point is worth noting. Not only can psychology be applied to ordinary life situations by persons who do not possess an exhaustive knowledge of the subject of psychology, but the very knowledge of the principles to be applied grows out of everyday experience. By the time early adulthood is reached or even before, everyone is compelled to become a psychologist of sorts. It is a mistake to assume that all knowledge of psychology comes from books, lectures, and courses in the subject. Since this science deals with human behavior, one must have acquired a rather considerable working knowledge of it by observing the behavior of oneself and of others long before meeting the first course or the first book on psychology. This is an important point for the beginner to remember, since there is such a frequent human tendency to dread and avoid that which is new and unknown. If the reader will remember that he or she is

already a psychologist of considerable experience, this dread will be greatly lessened. The purpose of this book is merely that of extending and organizing the knowledge of psychology already possessed by even the most inexperienced beginner. At the same time an attempt will be made to aid these beginners to apply their knowledge and experience in solving such psychological problems as may arise in their everyday living.

What Are the Characteristics of Behavior in the Psychological Sense?

Behavior Considered by Psychologists, Physiologists, and Sociologists.—Psychological behavior differs from the aspects of behavior studied by the physiologist. The psychologist is concerned with the relationship of the whole individual to his or her stimulating environment, while the physiologist deals mostly with the relationships of the various organs of the body. Probably there is no very sharp dividing line between these two branches of human science. To be complete each must consider some of the characteristics of the other.

In a certain sense sociology is also concerned with behavior; but for the sociologist, the unit to be considered is not the person. Instead, the essential unit is some social organization such as the family, the state, or any socialized group considered as a whole. As psychology is based in part upon a knowledge of the function of the separate bodily organs, so sociology is based upon a knowledge of the behavior of the individual. Thus, all three of these sciences are concerned with human behavior, but each limits its field arbitrarily as it borders upon the others.

Some Important Factors of All Behavior.—Some of the most important factors of behavior are common to all animal life, even to the simplest one-celled creatures. Three such traits will indicate nicely some of the qualities of human behavior. These three are: first, *irritability,* by which is meant the capacity to be aroused by stimulation from the environment; second, *conductivity,* or the capacity to conduct the results of the irritation to a remote

part through its tissue; and third, *motility,* which is the general name for the capacity to move bodily tissue in whole or in part as the result of stimulation from the environment. There are other capacities too, but these are among the most important for the study of behavior.

In the simplest forms of animal life there is little specialization of either structure or function. The one-celled organism does all these three things about equally well. As one goes further along the line of progressively more complex structures of the higher forms of life, one finds a greater degree of specialization of function. In man, the most complex of all creatures, certain tissues are highly specialized in irritability and are called sense organs. Others are specialized in conductivity and make up the nervous system; while the bulk of the body is highly developed in motility as it is found in the muscles.

All behavior, in the psychological sense, must be accounted for in terms of these three elements: irritability, conductivity, and motility.[1] The more this specialization has progressed, the more complex is the behavior which is possible for the members of that species. Man, as the possessor of the most specialized structure, has the most complex behavior of all animals. But even in this very complex behavior, the elements of irritability, conductivity, and motility are clearly seen. Responses always result from some stimulation of the organism through one or many sense organs. The results of such stimulation are conducted through the nervous system, often in a very complex manner, to remote parts of the body. This results in the responding of the muscles and glands. A fundamental general principle of psychology is that no behavior takes place except in response to stimulation.

It should be noted and constantly remembered that the behavior differences between man and other species, so far as psychology is concerned, are differences in degree and not in kind. Moreover, the behavior differences observable along the line from the amoeba to man make a fairly continuous series.

[1] This, of course, takes no account of the effects of the secretions of the glandular tissues, which have considerable significance in problems of behavior.

The progressive increase in complexity of the same basic factors in behavior is stressed here to emphasize the fact that, whatever the definition of mind may be, in a psychological, as distinguished from a theological sense, it must be possessed in some degree by all species of animals.

What Is Mind?—It has been common practice in the past to define psychology as the study of the mind. There need be no objection to this if the term "mind" can be defined in a satisfactory manner. There has been considerable disagreement among psychologists about what mind really is—a disagreement that is ages old. The next chapter will discuss some of the developments of the concept of mind. Here the reader must be content with some of the simple and common-sense concepts that find acceptance today.

Another characteristic of all animal life, in addition to the three already mentioned, might well be called modifiability. By this is meant the ability of the organism to have its possibilities of response influenced by its previous behavior. This is true of the amoeba, as has been shown experimentally. After ingesting a grain of carmine and repeatedly excreting it as useless to its needs, the amoeba finally profits from its previous experience by rejecting and avoiding the carmine grain. It is this ability to profit by experience which Guthrie has called an important characteristic of mind.

> Psychologists nowhere depart further from common sense than in their notion of the nature of minds. The man on the street acknowledges that minds are rather mysterious but he is definitely sure that mind is something that you either have or you haven't. Bricks haven't. He has, and he knows that he has. Dogs also have minds. Angle-worms? Here he becomes a little doubtful. Angle-worms seem very definitely to resent indignities in a way that a brick does not. And their daily round of activity seems to have something of a plan and a purpose behind it. A brick reacts to a kick by moving over, but there is a distinctly passive and helpless air about the brick's behavior. . . .
>
> But do angle-worms have minds? Are growth and reproduction and defensive reaction enough to qualify the worm for that distinction?

Plants also grow and multiply and defend themselves not only by their structures but in many cases by movement. Common sense is inclined to deny that plants have minds, for this is an opinion shared by only a very few detached sentimentalists.

What is it then that plants lack that is to be found in creatures which common sense endows with minds? Strangely enough, common sense will be found to offer a very good answer to this question. Growth and reproduction and defense reactions are life, but they are not mind. Mind is these and something more: it is growth and reproduction and reactions serving these ends plus something that common sense might call profiting by experience. . . .

. . . The ability to learn, that is, to respond differently to a situation because of past response to the situation, is what distinguishes those living creatures which common sense endows with minds. This is the practical descriptive use of the term "mind." . . . Mind must be for us a mode of behavior, namely, that behavior which changes with use or practice, behavior, in other words, which exhibits learning.[2]

How Is "Mind" Related to Body?—Man's early attempts to explain mind all took the form of assuming an extranatural being or force which has never successfully been brought within the recognized limits of science. Gradually this concept of mind changed until at present the best and most satisfactory explanations of man's behavior are to be found in terms of the relationships of man's organic structure to the forces and forms of energy of his environment.

In the uncritical terminology of everyday life, mind and body are considered to be more or less distinct entities, related, it is true, but still distinct and separable. Thus, when the man on the street says that he has "made up his mind" to buy a house, just what does he mean? What was involved in "making up his mind"? If one has been watching him for a few days, he will have been seen walking or driving around the house under consideration. He has probably gone through the house in some detail. This behavior is quite different from the kind he manifests if he is calling at this house for other purposes. He probably has exam-

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[2] E. R. Guthrie, *The Psychology of Learning*, New York, Harper & Bros., 1935. Reprinted by permission of the publisher.

ined the condition of the floors and their finish, and has inspected all fixtures. He undoubtedly has looked the furnace over with some care and has asked questions about the amount of fuel needed to heat the house. Then, too, he probably has gone to the court-house or to an abstractor's office and has spent some time in examining the legal title to the property. He may have taken the abstract to an attorney for his advice. He may have discussed the matter with his banker. Undoubtedly, he has not only talked about it to his family, but he has brought some members of the family to examine it with him. Then, as the result of all of this activity and much more like it, he announces that he has "made up his *mind*" to buy the house.

If an observer has been watching this man, he will have noticed the activity which has been described. There is another kind of activity which will have escaped notice, that which is commonly called consciousness. If he is asked to tell what has been going on in his consciousness, he will, unless he is a trained introspectionist, tell much of what he was seen to do. He will not be able to add very much that could not be guessed pretty well from careful observation of his overt behavior. This thing called mind which he says he "has made up" seems, after all, to be a more or less complex kind of behavior of the man as a whole, and that will probably be about as near to a satisfactory explanation of it as can be had even though the investigation be carried on indefinitely. In fact, that is about where psychologists, after all these centuries of attempted definitions, are forced to leave the answer to the question: "What is mind?"

Mind may be defined for the purpose of this book as the sum total of all of the capacities of the organism to respond to his environment as a whole individual. Note particularly that only those capacities to respond are meant which involve the reaction of the organism as a unitary, integrated individual. This whole organism may be considered to be made up of parts, but the capacities of the parts to respond as such do not constitute mind, although it may be necessary to understand these part responses in order to understand the nature of mind as here defined. This does not imply that any part has a fixed and permanent relation-

ship to the whole response. The whole response may change from time to time without seeming to involve more than a minimum of change in terms of the respective part activity. Neither is it true that all parts are equally involved in all adjustments, but in this capacity for behavior called mind integration is the essential feature.

Such a concept of mind, though it lacks something of the completeness necessary for all possible uses of the term, does have the distinct advantage of being readily workable. Such a definition makes no assumption of a thing superior to the body or directing the body's behavior from without. No supernatural or mysterious substance or force is introduced to describe or explain man's activity. No one part of the total of man's behavior is singled out as being of more significance than any other part. All the various aspects of man's capacity to respond as a single unit are regarded jointly as a function of the body.

At first, this definition may seem to be a very great departure from the usual sense in which the word mind is used. But is there really so much difference? Consider the case of the man who has "made up his mind" to buy the house. What is meant by such an expression? Is it not essentially that he is now capable of an act of which he was not capable before? Just what happened to his bodily mechanism is not known, but something, that presumably has taken place in this bodily organism, makes him a different man. Possibly something else may occur to this man in the next few hours that will "change his mind" again, i.e., will make him capable only of some other activity than that of buying the house.

There is another use of the term *"mind,"* one in which the meaning is quite like the term "intelligence." One sometimes hears a person say "John has a fine mind." What does such an expression mean? Is it not implied that John has an unusually large range of capacities to react and to modify his behavior in terms of experience? On the other hand, to say that John's mind is dull implies that John's capacity to respond to his situations in life is somewhat limited and that he does not profit readily from experience.

A problem arises from this definition. The term "mental activity" should presumably be the activity of the mind. But this is possible only if mind is something which itself can act. When mind is defined as the function of the organism as a whole, the term "mental activity" becomes absurd unless it can be given a meaning that will be useful and convenient. The common-sense use of the term may well be examined to discover if the layman's everyday use of it has a significant meaning.

How does mental activity differ from the type of activity usually called physical or motor? The answer provided by common sense is that these activities cannot be distinguished from each other except in terms of some arbitrary definition. As the term "mental activity" is usually employed, it designates those responses which do not involve overt and easily observable behavior. In the school task commonly referred to as "mental arithmetic" the pupils are observed to be stimulated by the oral reading of the problem and then to give the answer without anything very noticeable happening in the interval. If a person be asked to visualize a house, some few minimal movements of the visualizer's eyes, lips, and neck may be noticed, but there is usually nothing that will provide the observer with a clue as to the color or size or kind of house that is imagined. The person who has visualized may be able to describe his image in detail, so that, if the report be regarded as an honest one, some complex activity must have taken place. This is the kind of activity which is customarily called mental.

A little experiment will show this point of view to advantage. Most people would agree that multiplying one three-place number by another without any writing surface or writing instrument would be a "mental" task. This is the experiment. Get a friend to try such a task in arithmetic and *at the same time* chew a piece of candy. Close watch should be kept of movements of the eyes, hands, and other parts of the body. The eating of the candy will in all probability interfere with the arithmetic problem. Why? Possibly the answer lies in the fact that the lips, tongue, and throat muscles cannot manipulate the candy and at the *same* time carry out the sub-vocal speech involved in multiplying. The less

practiced in mental multiplication the subject of the experiment may be, the more likely it is that the eating will interfere with the multiplication. Eye movements are frequently important parts of visual imagery, and they may be involved as the subject moves his eyes around over the imaginary surface upon which the problem is set in his visual image.

At the other extreme, probably none of the activity commonly called physical is entirely devoid of these less easily observable response elements. The whole range of activity from the extreme called purely "mental" to that commonly called purely "physical" can be represented as having a place somewhere on a straight line, as shown in Figure 1. At the end of the line marked *M* would be placed such an activity as that of the multiplication problem mentioned. Here very little of what goes on in the way of activity can be observed, though when the answer is reported it is apparent that some activity has occurred. The farther to the right one goes on this line, the more observable would be the total pattern of activity.

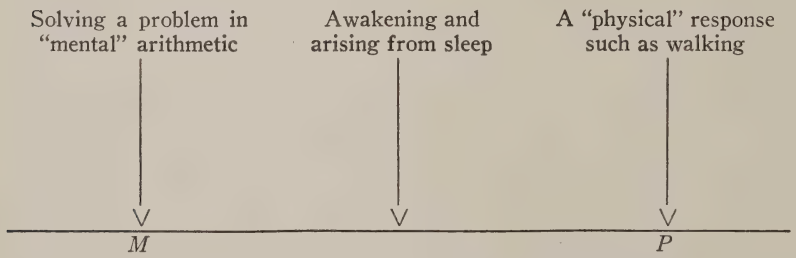

Figure 1. Representation of the Activity Range Through the Range of Observability from "Mental" to Motor Activity

Near the right end of the line, at *P*, might be placed such an activity as walking, tying one's shoes, or mowing the lawn. In all of these there is a readily observable pattern of response which in everyday language is called motor or physical. Of course, there are important elements of the whole pattern which cannot readily be observed, just as at the other extreme there are some elements that are observable. In other words, there is no activity which may be properly called either purely physical or purely mental.

Note, therefore, that Figure 1 indicates one level of activity and not two.

Since the only definitely known characteristic of the activity called mental is this quality of not being easily observed, why not let it be plainly understood that when this term is used it simply means that some important parts of the activity cannot readily be seen? That is exactly what the term will mean when it appears hereafter in this book.

Convenient Grouping of the Factors That Determine Behavior

Two Groups of Factors.—What must be known before it is possible to predict the response which any human being will make at any specified time? The answer is complex indeed. In fact, much of the discussion of the following chapters will be concerned with the several parts of the answer to this question. The whole answer may be said to fall into two rather distinct divisions: (1) the nature of the total stimulation impinging upon the person at the moment, and (2) the structure of the organism of the person at that particular time.

Factors of Stimulation.—The first group of factors is of interest to the psychologist only in a limited sense. They are of much more direct concern to the physicist, to the chemist, and possibly to the physiologist. The psychologist is concerned with them only to the extent that they are the necessary agents for releasing the potential energy of the human organism. As factors influencing behavior, they are like the trip mechanism which releases the energy of the hammer head of the pile driver. Strictly speaking, they can neither determine the nature nor the direction of the response. Neither can they determine the extent or amount of the behavior except in a limited sense.

All stimuli to which the human being can respond are forms of natural energy. Each kind of stimulation differs from every other kind in some natural characteristics. This differentiation corresponds to the specialization of the sense organs. The func-

tion of these forces is simply to set going in the sense organs another kind of energy called the nerve impulse. So far as is known, the nerve impulses, no matter what sense organ originates them, are exactly alike. The sole business of any sense organ when it is affected by an appropriate stimulus is to generate a nerve impulse and discharge it into the nervous system.

For convenience it is sometimes assumed that a single stimulus may act alone in generating a response. This never actually happens. Everyone is at all times being affected by a host of different stimuli, and an explanation of his total response at any one instant must take into account the total pattern of stimulation. An illustration may help to make this clear. Disregard for the moment the factors of bodily structure. It is obvious even to the most casual observer that what a person will do in response to a pin prick will depend in part upon what other stimuli are acting upon him at the instant when the pin prick is administered. If applied in a laboratory situation, one kind of response might be obtained. If given by a friend in a playful manner, a somewhat different response might be expected. Still a third kind of response might be obtained if it were administered by an enemy or as part of a hostile situation. Still further, it might make a considerable difference whether it was the first or the thirtieth in a series of pin pricks in quick succession, all of them of equal but low intensity.

Factors of Organic Structure.—As complex as the factors of stimulation may be in producing a response, even more complex are the factors of bodily structure. Anything which influences the structure of the organism, presumably influences its behavior when the organism is stimulated. These factors fall into at least four large and fairly distinct groups: the factors of heredity, maturity, and experience, and those due to certain periodic cycles of bodily function which are distinctly physiological in nature. These will be discussed briefly at this point and in detail in later chapters.

1. The problem of inheritance of behavior resolves itself into the question of the inheritance of organic structure, since it is

evident from biological research that only the potentialities of developing bodily structures can be inherited. Either heredity has no influence upon behavior, or such influence must be accounted for in terms of hereditarily influenced structure. No new principles or hypotheses are needed to account for the latter. The facts of biological transmission of structural traits from generation to generation are already well established. More detailed consideration of the influence of heredity on behavior must await the chapter dealing with the question, "Why Do Certain Behavior Traits Seem to Run in Families?"

2. Another chapter, entitled "How Does Maturity Modify Behavior?" will deal with the second of these groups of factors. No parent would think of expecting a six-months-old child to walk and run, because even the layman would recognize the child's lack of sufficient strength to permit such behavior. In a similar manner, the pre-adolescent is not expected to behave like the later adolescent or adult in the matter of mating and reproduction. The reason for this is again the immature state of the pre-adolescent's bodily structure. In this book the term maturity is restricted to that meaning of the word which deals with sheer growth of the structure. It does not include the effects of experience which are included under this term by some psychological experimenters.

3. Concerning the structural changes involved in learning, the psychologist must to a great extent depend upon hypotheses. The exact nature of such changes is not known. It is of considerable significance, however, to recognize the rather marked agreement among neurologists and psychologists that some structural changes are basic to learning, that there is some sort of a "neurological trace" whereby the person is structurally different before and after learning. The best hypotheses at present point to this effect as taking place chiefly in the central nervous system. It is difficult to study the nervous system in the living organism, but while awaiting the discovery of the facts, reasonable and satisfactory hypotheses may be employed. Further discussion of this group of factors will be found in the chapter, "What Is the Effect of Experience Upon Behavior?"

4. The other group of factors affecting the structure, and hence the behavior, of the organism includes such periodical changes of the body as those involved in hunger, thirst, sex, and fatigue. In each of these instances there seems to be essentially an equilibrium, the disturbance of which by internal bodily changes results in an internal type of stimulation at present not well understood. This stimulation is closely related to some of the problems of motivation and as such will find fuller treatment in the chapter, "What Are the Mainsprings of Behavior?"

It is possible that there are factors determining the structure and hence the behavior of an individual that will not fit conveniently into any one of these four categories. It is also probable that there are certain factors which might conveniently be considered under more than one of these headings. Such facts need not be alarming in the least. Any classification is usually valuable in terms of how convenient it is rather than how exclusive it may be. This classification will furnish a convenient basis of attack upon the complexities of the problems of the how and why of human behavior, which, after all, is the most important quality it could possess for the purposes of this book.

The Psychologist at Work

The Task of All Science.—The fundamental task of all science is to gather data, to classify those data, and to explain them. Science attempts to reduce its explanations to as few general principles as possible. Furthermore, it confines the observations, classifications, and explanations to natural phenomena. This means that it steadfastly refuses to deal with events which demand an explanation in terms of extranatural or supernatural causes. It is true, of course, that some events which in times past have seemed extranatural have now been brought within the compass of natural law, and it is possible that similar explanations may be found in the future for phenomena considered extranatural today.

Science and superstition are alike in that both assume cause and effect relationships and both seek to understand and explain

what is observed. In other respects they differ greatly. Science seeks to reduce all explanations to a few general principles, while superstition seeks a new explanation for each event observed. In addition, science insists upon rigid control of all factors which might contribute to the event observed, and presents an explanation only when all possible tests of its findings have convinced the experimenter of the correctness of his observation. Superstitious man, on the other hand, tends to accept as true the first explanation that suggests itself. He often fails, yet he flatly refuses to put his explanation to a controlled test. He may go so far as to refuse to accept the failure of his explanation, even in cases when the explanation proves to be contrary to fact.

Psychology as a Science.—All the sciences have had their origin in philosophy. Some separated themselves from philosophy earlier than others. Mathematics and chemistry were among the earliest to become independent sciences. Psychology was one of the latest to develop, despite the fact that philosophy's earliest problems dealt with the explanation of man and his behavior. The long period of development which psychology underwent before it became a science will be traced in the next chapter. Here it is enough to note that not only has psychology had the same origin as other sciences, but it has also had the same general course of development and employs the same general methods as do all other true sciences.

Each science deals with a restricted part of the whole field of natural phenomena. In fact, within each field there is a great deal of specialization, all dealing with the same great general principles, but concentrating the attack upon special areas within the whole field. Thus, in chemistry, certain experimenters confine themselves to the discovery of new organic compounds and new ways of developing familiar compounds from new sources. In the same way, some psychologists spend their lifetimes experimenting with rats, dogs, and monkeys by exploring the results upon behavior of the destruction of parts of the brain. Others work with equal industry in their nursery-like laboratories, studying children's behavior in many different situations. Still others

spend their time in discovering the optimum conditions of learning.

In the process of developing their general laws all sciences employ hypotheses. Since primitive times man has been making guesses to explain what he observed. As man learned more about himself and his world, these guesses became more accurate. The ones that did not check with further observations were either changed or dropped altogether. As man's knowledge developed into the sciences, these guesses came to be called hypotheses. Often these hypotheses were so definitely proved that they were no longer guesses and were then called laws. Every science attempts first to set up hypotheses and then to verify them to the point where they become fundamental principles or laws.

Psychology, like other sciences, is attempting the same task. The field of psychology presents greater difficulties of observation than do other fields of natural science. Hence, in psychology the development of hypotheses into laws has not progressed to the point that has been reached in the other fields. There are some hypotheses in this field, however, that seem to be well on the way to verification. It is probably better to continue for the present to regard them as hypotheses rather than to call them laws. They seem to check with the observed facts and are extremely useful as means of explaining other facts.

A Hypothesis Which Is Fundamental to Psychology.—One such hypothesis refers to the first general group of factors determining behavior and emphasizes the importance of the stimulus. It commonly goes by the name of the *reaction hypothesis*. Briefly stated, it is that every reaction is the result of a stimulus acting upon the body through the sense organs. No action is to be thought of as occurring spontaneously, i.e., without some stimulus to give it impetus.

This hypothesis has far-reaching implications. It may seem to the beginning student of human behavior to be contrary to fact, especially in the case of the more subtle types of behavior such as thinking, imagining, and perceiving. A thought, an image, or a percept may seem to occur without any causally related preced-

ing stimulus, and it may be difficult to discover what was the initiating incident or object. The failure in such cases may be due to a lack of skill and insight on the part of the observer.

An illustration may be helpful. As this is written I am reminded of an uncle whom I have not seen for some time. I am not aware of having even thought of him recently. The question naturally arises why this particular person should be called to mind at this particular moment. What was the provoking stimulus? An examination of the responses immediately preceding gives the following as a fairly complete account of the chain of events that ensued. The name of the city of Seattle was mentioned by a radio speaker. This brought an immediate response, due probably to my familiarity with that city. In turn there followed the recollection of the University of Washington campus where I spent some time as a student. This recalled a recent visit to that campus, at which time I noted particularly the removal of some of the old Exposition buildings. This recalled visit suggested the Exposition, which in turn suggested the uncle who used to entertain me with tales of the exhibits. I was then a small boy in a rural community where exciting incidents from the outside world made a profound impression. Here, then, was a whole chain of responses, subtle and hard to ascribe to particular parts of the bodily mechanism. Nevertheless, it seems clear that each of the succession of responses produced a stimulus which in turn called out the next succeeding response. A parallel situation involving a chain of responses in which the whole process can easily be observed will indicate more exactly what is meant by the statement that each response produces a stimulus which in turn initiates another response.

If the cheek of a three-months-old infant be stimulated, a usual response is the turning of the head toward the point stimulated. If the infant is in the regular nursing position, the lips may thereby be brought into contact with the nipple. This is a normal stimulus for a seizing and sucking movement of the lips. This response normally results in a flow of liquid into the mouth and throat. This is the usual stimulus for swallowing, and so on through the whole process of digestion, including both muscular

and glandular responses. It is not correct to think of the increased activity of the gastric glands in the stomach as resulting directly from the touch on the cheek of the infant, but the orderly sequence of stimulus, response, stimulus, and response is here clearly shown. In the case of the recalled uncle the situation is exactly the same, but the intervening processes of stimulus-response are not so easily or completely observable. Otherwise they are alike. In any event these illustrations will indicate the far-reaching significances of this basic hypothesis.

Psychology Uses Data from Other Fields of Science.—The interrelationship of all fields of science has already been indicated. It is often expedient to employ facts which have been obtained by experimenters in other fields. Psychology freely acknowledges its debt in this respect to such sciences as biology, medicine, physics, and chemistry.

The effect of heredity upon behavior has been made clear by the employment of the laws of heredity developed in the field of biology. Until these were available, many erroneous notions were held by students of behavior. One of these was the idea that the behavior, including the thoughts and temperament of the unborn child, was influenced by what the mother said and did during pregnancy. Instinctive behavior was also explained as the result of the inheritance of habits of many successive generations of the members of the species.

The effect of normal and abnormal secretion of the endocrine glands is only now coming to be known in the field of medicine, and already this knowledge is being used by psychologists to explain normal and some abnormal behavior. In early times a certain kind of defective mentality known as cretinism was explainable only as an act of a creative divinity. Later, the cause, although unknown, was assumed to be a natural one. Only within recent years has it been discovered to be due to subnormal functioning of the thyroid gland. Now the cretin child can be assured of a reasonably normal development of body and behavior through glandular treatment while still an infant.

The study of emotional behavior has similarly become partly

a study of human chemistry, and a knowledge of the function of the members of the body, particularly of the limbs, is greatly enhanced by a knowledge of the principles of mechanics.

Many of the experimental techniques employed in a psychological laboratory today have had their origin in ideas borrowed from the laboratories of the other sciences. To be a successful experimenter in a modern psychological laboratory demands more than a chance acquaintance with the procedures of other scientific fields.

Psychology Employs Its Own Experimental Methods to Secure Data.—It must not be inferred from the preceding paragraphs that psychology is dependent upon other sciences for all of its data. It has experimental techniques and special tools and devices by which it secures much data for itself. Parts of this experimentation can be carried out directly with human beings; other parts can be better accomplished by using some of the lower animals as subjects of experiment. An illustration of each of these methods is given below followed by a brief synopsis of the cautions necessary in conducting scientific psychological experimentation.

1. Human Experimentation. T. R. Garth of the University of Denver's department of psychology is trying to find an answer to the question, "Are the higher average intelligence test scores of white children compared with Indian children due to differences of heredity or to differences of experience?" It is not enough to measure the intelligence of large groups of children of each race. Other factors must be considered. Indian children tend to live different lives and have different experiences than do children reared in the homes of white parents. Therefore, Garth is gathering data relative to the intelligence quotient of many Indian children who have lived intimately in the homes of white foster parents for several years. These instances are not numerous and another caution must be exercised. There is the possibility that those Indian children selected to be reared in a white home are originally superior children. Furthermore, how do these white homes compare with the average of all such homes

in furnishing experiences to be sampled by the intelligence test? This is a kind of psychological experiment that takes years to accomplish and which must be repeated several times before the problem can be considered really solved.

2. Animal Experimentation. Some kinds of psychological experiments cannot employ human subjects because of obvious social disapproval. Lashley has been working for years with rats and other lower animals to determine the effect upon behavior that will result from the destruction of parts of the brain. Similarly, society would not approve of putting a human child in the environment of the higher apes to see how much its developing behavior would be influenced by heredity and how much by an unusual type of environment. The Kelloggs partly solved this problem by taking a female gorilla infant into their home and rearing it as a child, not as a pet, along with their own infant son for a period of nine months.

In other instances it is profitable to study lower animals either in comparison with human beings or by themselves. The principal reason for this is that the relative simplicity of the behavior of such animals gives the effect of a slow-motion picture study. Besides, the lower animals can often be controlled experimentally more easily than humans, since they are less influenced by social contact with others of their species. Moss and other investigators have tried to discover the relative forcefulness of such inborn physiological drives as hunger, thirst, sex, and fatigue. This would be very difficult to do with human beings because of the effect of social experience.

Human beings are the most highly specialized of all animals, and consequently due caution must be employed in interpreting human behavior on the basis of animal experimentation. Nevertheless, this type of study bulks large in the psychological literature. It should be remembered that the best source of information about man is the study of man himself. Anything else is only a substitute. In this book experimental data derived from the study of human beings will be employed for the most part. This applies particularly to the anecdotes used for purposes of illustration.

Some Difficulties of Psychological Experimentation.—The scientific method of obtaining data is a rigorous one, demanding exactness and care in the employment of its procedures and techniques. The general types of cautions applicable to all science will be mentioned first and these will be followed by a brief discussion of a particular difficulty confronting students of psychology.

In any scientific experiment the experimenter must first carefully state his problem. He should consider any previous effort on the part of himself, or of others, in order to avoid all possible pitfalls. He must select the subjects for his experiment in such a way as to insure that they are representative samples of the whole class for which conclusive evidence is sought. He must secure or construct the necessary apparatus and measuring instruments, making sure that they will actually do with accuracy what he wants them to do. He must control all possible factors, holding all but one of them as constant as possible and allowing only one to be the experimental variable. This is necessary if he is to discover the exact cause of such results as he may obtain. He must insure a permanent and complete record of his procedures and results. He must carefully and objectively weigh his results in drawing his conclusions and provide for the repetition of the experiment by himself or others.

This is an exacting procedure. Is it any wonder that scientific facts are obtained at such great cost of effort and ingenuity? And is it any wonder that facts obtained by means of such procedures have considerable weight and influence?

Reread the very brief account of Garth's experiment, and note how his procedure takes into account the several points mentioned here. These factors apply in any kind of experimentation in any field of science. Few experiments actually meet these ideal conditions. Certainly, much of the informal experimentation of the beginner will fall short of such conditions. But as the psychologist approaches this ideal, his discoveries will increase in reliability.

One difficulty is of utmost importance to the amateur psychologist and hence deserves special comment. It is relatively

easy for the chemist to view his reagents in his test tubes and retorts in an impersonal manner. After all, they are something independent of himself. But, when the psychologist observes human behavior, whether of himself or of another, he is dealing with something that is directly or indirectly personal. It is most difficult at times for the psychologist to assume and maintain a detached attitude. It is relatively easy to understand that physical and chemical phenomena have natural causes. It is sometimes much more difficult to understand that equally natural causes underlie psychological phenomena.

An Outline Summary

Eleven points developed in this chapter are basic to the discussion of the chapters which follow:

1. Psychology is the study of behavior for the purpose of predicting and controlling the behavior of the individual.
2. The problems of psychology are varied in form and touch upon many aspects of everyday life.
3. The psychologist's interest in behavior is confined to behavior of an integrated sort that is significant as the response of an individual. In this respect it differs from the interests of the physiologist and the sociologist.
4. There are certain factors of behavior that are common to all animal life. As the structure of bodily organisms increases in complexity and specialization, the corresponding possibilities of behavior show a similar increase.
5. For this book, mind is to be regarded simply as a mode of behavior, i.e., mind is what the body does as the integrated and modifiable behavior of the individual as a whole unit.
6. The common-sense examination of behavior called "mental" reveals that it is as truly the activity of the organism as the behavior called "physical." Since the only significant difference is in terms of the ease of observation and localization, such difference will be taken frankly as the basis of a definition of "mental" behavior.
7. Prediction and control of behavior will be possible in terms of how accurately two groups of complex factors are known.

A. It is necessary to know what stimuli are acting upon the person at the time of and immediately before the response which is to be predicted or controlled.

B. It is necessary to know as exactly as possible what is the organic nature of the mechanism. To do this, at least four groups of factors must be considered.

(a) The individual's heredity must be known in order to know the possible limits of his structural development.

(b) The individual's maturity must be known in order to determine how much of his potential growth has taken place.

(c) The individual's previous experience must be known in order to determine what changes this has produced in his behavior.

(d) Finally, a variety of periodic physiological conditions of the organism must be known in order that their respective influences may be considered in prediction or control.

8. The task of psychology is simply a specialized part of the whole task of science, which is to gather data, to classify them, and with these data explain natural phenomena.

9. In explaining natural phenomena, hypotheses are developed, and, when necessary, are used in the explanation of other phenomena. One such hypothesis, which is of basic importance in psychology, is the reaction hypothesis which states that no response of the organism is possible except as a reaction to a stimulus.

10. Psychologists borrow freely from the experimental data of other fields of science. They also do much experimentation for themselves in seeking new data with which to explain behavior. Where the direct attack of the study of human behavior is impossible, the psychologist substitutes the indirect study based mostly upon animal experimentation.

11. Like all other sciences, psychological experimentation adheres rigidly to the scientific method and scientific attitude. This is done in the face of the difficulties of all scientific experimentation and in addition under the handicap of the difficulty of maintaining an objective attitude where the thing being studied is of vital personal interest to the experimenter.

Problems for Further Thought

1. Make a list of twenty or more kinds of human behavior that might be of interest to the student of psychology, and which illustrate as wide a variety of human activities as possible.

2. Mention ten or a dozen kinds of information that the physiologist must supply to the psychologist in order that the latter may explain behavior. Do the same for information that the psychologist must supply the sociologist.

3. List the chief aims of science. Show how these aims are involved in psychology.

4. Suggest several explanations for some bit of commonplace behavior of your own which you have observed, and select from these that one which best explains it and which involves the fewest assumptions.

5. Suggest several kinds of information, in securing which the psychologist must employ animal experimentation. Include several different types. Point out, in each case, the more important limitations in applying the results in interpreting human behavior.

6. Secure, if possible, a chart or other device used by a phrenologist and critically examine it to discover how reasonable it is. This will require also that you compare the chart with a diagram, drawing, picture, or model of the brain that shows the division of its working parts. Write out your conclusions from your examination.

7. Make a list of a variety of activities arranged in order of increasing difficulty of observation of the essentially significant parts of the response. Then consider this list in the light of the suggested definition of "mental" and "physical" kinds of activity. Does the definition seem to correspond to a common-sense interpretation of facts?

8. Make an examination of the mental experiences preceding some unexpected recall of a person, place, or incident where the immediate stimulus for the recall is not readily recognized. The illustration on page 21 will suggest the procedure.

9. Explain in your own words the two chief reasons why students of human behavior must be particularly careful to be scientific in their explanations of what they observe. Illustrate from your own experience.

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Chapter 2

MAN'S WAYS OF EXPLAINING HIS BEHAVIOR

This chapter will discuss the great general trends in the development of man's efforts to explain his behavior. Present-day explanations are related to those of the past in two important ways. Some of the present explanations are directly carried over from former times. All the rest have their roots in those of the past and have developed from them.

Some form of chronological arrangement must be employed because each stage of development has been based upon those preceding. However, a strictly chronological treatment might fail to emphasize the important trends in this development of the understanding of behavior because it is the understanding of behavior and not the behavior itself that has undergone a fundamental change through the ages. Certain great general developments of the common social heritage will be outlined to trace the many specific influences they include. These several developments are inherent in the evolution of the whole cultural civilization of Western Europe and America.

Five of these general developments will be examined in turn to show how each has contributed to present-day explanations of behavior in the two ways already suggested: (a) animism, (b) the philosophy of the classical Greeks, (c) the Christian religion, (d) the pre-scientific psychology, (e) the birth and growth of psychology as a science.

Prehistoric Beginnings of Man's Belief in the Dual Nature of Himself.—Very, very primitive man was probably entirely unable to distinguish between spirit and matter.

But at last the day did come when, like the stealthy climb of a slow dawn, the idea of spirit crept into man's head. It came to him almost unavoidably. Of a morning he awoke, looked up bewilderedly, at the

familiar rocks of his cave, and gasped, "Hello, that's queer!"—or sounds to that effect. For there he was just where he had been when he had stretched out and fallen asleep the night before—and yet he knew he had wandered very far from that place during the interim. He was certain of it! Very vividly he remembered fighting huge beasts during the night, or hurtling down ravines, or devouring whole mastodons, or flying. . . . And yet there he was, still lying in his smelly cave, for all the world as though he had never for a moment left it! . . .

Of course, we civilized folk would explain the mystery by simply saying the fellow had had a dream. (Which is perhaps not so much of an explanation at that.) But he, poor savage, could not even guess at such an explanation. The idea of a dream was as foreign to his mind as the idea of a monocle or a wardrobe trunk. No, the only explanation he could offer himself was the obvious one that he was dual: that he possessed not merely a body but also a spirit, and that while his body had that night remained decently at home, his spirit had gone a-roaming. . . . Why not?

There were other experiences which that answer seemed to explain. There was, for instance, death. Here was a body erect and vibrant one moment, and prostrate, inert, the next. What had happened to it? . . . Obviously the same answer fitted: its soul had fled.[1]

Browne's account is only one man's guess as to what may have been the beginning of man's supposition that he had a dual nature. But it is as good a guess as any and seems to fit satisfactorily into the known facts about primitive man. It is considerably oversimplified. Probably all members of the primitive group had many such experiences and in talking it over among themselves sought for an explanation for such occurrences. In the course of time it can be seen how primitive man might have developed the belief that his nature was twofold, consisting of the physical body and a something else which he has never been able to define satisfactorily or to account for in any other way.

Primitive man's lack of knowledge of himself was largely responsible for his inability to explain what he observed of his behavior. He was unable to stand off and look at himself in an objective way. Even if he had been able to do so, he would still

[1] From Lewis Browne, *This Believing World*, pp. 30–32. By permission of The Macmillan Co.

have been unable to explain himself any more satisfactorily than he was able to explain the thousand and one things of his daily environment.

Animism as a Primitive Method of Explaining Control of Behavior.—Animism may be defined as belief in spirit domination; principally, the belief in the idea that certain natural objects are possessed of spirits. Each object is supposed to have its own peculiar spirit. This might be described in another way by saying that the object is assumed to consist of two parts—a material part through which the object is expressed to the senses, and another having the nature of a spirit. These spirits are believed to be detachable from the material substance of the object. Man is one of these objects. A man's spirit is assumed to be able to leave his body under certain conditions, or the spirit from some other object may come into man's body and influence or dominate the behavior of that particular person. Man's control of his own behavior, therefore, is to be gained by preserving the proper relationship with these spirits. He seeks the aid of friendly spirits as a means of gaining his own ends, while he attempts to prevent the unfriendly ones from interfering with his behavior.

Among primitive peoples, almost all objects, animals, plants, inorganic things like rocks and rivers, and even forces and forms of energy such as light, darkness, and fire are presumed to possess these spirits. Peoples a little less primitive distinguish living and moving things from those not living and moving. They attribute spirits mostly to living things and certain forces of nature.

In a number of places in the world there are today races of people who may be thought of as still possessing these characteristics of primitive times. Sometimes they have numerous contacts with other civilizations but maintain their primitive behavior in spite of these contacts. An example of the animistic beliefs of such a primitive people will furnish an excellent illustration of the way primitive man has explained and still does explain himself and his behavior.

In the island of Haiti there exists today a civilization which in some respects furnishes a very good picture of the life and

behavior of primitive man. The habits and beliefs of the simple peasant people of this island constitute an excellent example of the efforts of primitive man to explain how his behavior is controlled. The religion of the Roman Catholic church is supposedly the belief of the Haitian people. In actual fact, however, much of the population expresses its belief in the Voodoo worship commonly found there. This religion is an amazing system of credence, a compound of the African beliefs of the blacks brought there as slaves and the tenets of the Roman Catholic church. The Voodoo worship is as pantheistic as any of the religions of primitive times. According to Voodoo, all spirits have their abode in natural objects of the environment, but any of them may be incarnated in the bodies of the human beings and may thus control human behavior.

The control of these spirits is often obtained through the use of fetishes and the working of magic. Seabrook, who spent some time among the Voodoo worshippers of Haiti, gives an interesting account of how a friendly priestess, Maman Célie, made for him an "ouanga" packet to preserve him safe from all harm.

> It was the realization of this, I think, that enabled me to see, somewhat with their eyes, as more than mummery, the ceremony of the *ouanga* packet's making.
>
> In a small, bare room . . . a large cowhide was spread, hairy side upward, on the earthen floor, and around it in a circle sat solemnly a dozen negroes. . . . The only light flickered upward on their faces from small candles arranged as a geometric pentagram on the cowhide. . . .
>
> Spread in the center of the candle pentagram, on the cowhide, was a square red cloth, like a napkin, which was to be the covering of my *ouanga* packet. Bright ribbons, red and yellow, lay beside it, and also feathers brilliantly dyed. In little, separated piles upon the cowhide were balsam leaves, leaves of the castor-bean plant, roots of the lime tree; a saucer of flour, a saucer of ashes, a bottle of clairin, a bottle of perfume, a tiny iron crucifix.
>
> Maman Célie and I sat on one side in the circle, Papa Théodore facing us. While they chanted . . . old Théodore took some of the roots and leaves, mixed them in a brazier, charred them over a fire . . . then pounded them together in a mortar. . . . Atop these leaves he now laid the crucifix, also a tuft of hair (tied together with thread)

which had been cut previously from the central crown of my head; a paring from my right thumb-nail, and a small square cut from a shirt which had been worn next my skin. . . . Articles intimately connected with the individual to be affected . . . are used variously as a substitution for himself. . . .

Maman Célie handed me a copper coin and instructed me to place it on the packet. And now, before it was tied up, she told me to make a prayer (wish). I hesitated, then stood with both arms stretched straight out before me, palms downward, as I had seen them do and said in English:

"May Papa Legba, Maitresse Exilée and the Serpent protect me from misrepresenting these people, and give me power to write honestly of their mysterious religion, for all living faiths are sacred." [2]

A quotation from another source will indicate still further the psychological effect of this sort of primitive control of man's behavior.

Jungle magic is never for effect. It is purposeful, studied. When famines, pestilences, and evils come upon the forest people, it is magic that wards them off. It deals with things—with medicines, potions, and ideas—which, in the forest, are more real than steel and far more dangerous. Magic saves. Then it is white. Magic kills. Then it is black. It is the science of the jungle.

The way of an enemy is never direct. The mysterious ways of jungle death are the only ways down which death comes. Sometimes a Bushnegro, out of jealousy, anger, or fear, wishes another dead. So he sets his fetishes against his enemy, invokes the *winti* of the bush to set upon and destroy him. It is dangerous business, for the murderer knows that in time he will himself be almost inevitably destroyed. But there are stronger passions even than fear.

The spirits of evil are set in action. The one against whom they are working learns of his mortal danger. He attempts propitiation, seeks to make his protective fetishes stronger than the destructive fetishes of his enemy. But almost surely, soon or late, he dies, and his family know that he has been murdered. That is the forest way.[3]

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[2] W. B. Seabrook, *The Magic Island,* New York, Harcourt, Brace & Co., 1929, pp. 49–53.

[3] John W. Vandercook, "White Magic and Black," *Harper's Magazine,* October, 1925, pp. 548–553.

It is evident that these animistic beliefs play a very important part in the control of a primitive person's behavior and that of his friends and enemies.

Animism, or something closely resembling it, is evident in much of the believing and thinking of present-day modern civilizations. In the first place, there are many beliefs which are called superstitions by some but which are important determiners of behavior of their believers. Many of these represent a type of animism not far removed from that of primitive man. In addition, there are many superstitions and some religious beliefs that have not developed much beyond the stage of animism. In other words, modern social believing and thinking are shot through with this sort of social heritage.

Two Theories Explaining Control of Human Behavior in the Times of the Classical Greeks.—The Greeks were much more systematic than was animistic primitive man in their attempts at explaining themselves and the world which they observed. In this respect they differed from their ancestors. They were more cautious in developing their explanations and more willing to employ a sort of controlled imagination, somewhat akin to that shown by the modern scientist in his present-day attempts to explain what he observes. These Greeks began to separate their religion from their explanation of natural events and thus to develop what has since come to be called philosophy.

Philosophy in this primitive sense may be defined as a systematic attempt to explain things which the philosophers themselves have observed or which they know from the observations of others. It differs from animism chiefly in that it is much more systematized. The animist explains each individual observation separately. The philosopher attempts to develop a broad system of explanations which will serve in a wide variety of instances. In their explanations, however, both employ imagination in the form of more or less shrewd guesses in addition to facts already known. Another characteristic difference between the animist and the philosopher is the ability of the philosopher to assume a more detached and objective point of view than does the animist.

The philosophy of the early Greeks was probably centuries in the building; there is no record of its earliest development, nor was it confined to the Greeks alone. It simply had its culmination in the teachings of the great philosophers who lived in classical Greek times. The development of a systematic knowledge of the world around them and their explanation of it was still in an elementary state 500 years B.C. About that time Greek philosophers began to formulate an explanation which was logical and which seems to have been the forerunner of the logical philosophies of today. It should be remembered that these philosophers were attempting to establish a universal means of explaining the supposed dual nature of man. At the same time, they were attempting to explain the structure of all substances and the relationships between substances.

Very briefly, their teachings were that all the universe was composed of atoms. These atoms were exactly alike as to substance but differed in shape and in size. They were believed to be driven by an unknown force, so that they were always in motion. When the larger atoms came together, they formed the various kinds of material substances which were the familiar sensed objects of the environment. The mind or soul, for which there seemed to be several terms, was not believed to be composed of this same substance. It was made up of another very subtle substance which could not be sensed directly. The very small atoms which composed it penetrated between the larger atoms that made up the material of the physical body.

Some philosophers taught that different kinds of mental activities were due to the motions of these very small atoms. The particular kind of mental activity was determined by the part of the body involved. It was thought that desire was located in the liver, anger in the heart, and reason in the brain. The atoms which made up the soul were believed to be not only very small, but spherical in shape and practically identical with those which made up fire. For these early philosophers, this explained the warmth of living bodies.

Two Greek philosophers are of particular interest in any attempt to trace the development of man's explanation of himself.

These men lived in the third and fourth centuries B.C. They are important because of the influence that some of their teachings have had since their time upon systematic explanations of man's behavior. They differed in at least one very important respect, and it is this difference that is pertinent to this discussion.

Plato was the first of these two philosophers in point of time. He does not seem to have developed a connected system of philosophy of his own, but he largely reflects the teachings of the most advanced thinkers of his own time and of those preceding him. He attempted to explain the human soul or mind as an active substance, made up of the small atoms already mentioned. This soul was believed to be imprisoned within the body during life and was the means by which the acts of the body were controlled. The soul was also the element of the body which obtained knowledge by means of what are now known as sense organs. He divided the soul into several parts and assigned them locations in the body much as did his predecessors. The important thing to note in regard to the teachings of Plato and his predecessors is that the mind or soul was thought to be a material substance which inhabited the body during life and which was presumably more or less free to come and go. While it was in possession of the body, it had complete control over it.

Aristotle's span of life overlapped that of Plato's but extended a few years beyond. He has probably exerted more influence upon all kinds of later scientific and philosophical thought than any other of the early philosophers excepting, possibly, Plato. His teachings are of interest to psychology because of the accuracy of his observations and his shrewd insight into human behavior and because of his influence upon psychological theory. The most important difference between Aristotle's explanation of human behavior and that of his predecessors, including Plato, lies in his explanation of the nature of the mind or soul. According to Aristotle, the soul was not a substance at all. He used the Greek word which is best translated as "form." He thought of the soul as the form of the matter composing the body. Probably the word "function" as it is used in mathematics today would be a satisfactory equivalent of Aristotle's concept of the soul. In

other words, the soul was what the body did. In modern terminology it might be explained by saying that the soul was the activity of the body. The particular kind of activity of the soul was determined by the character of the structure of the body. If the whole body were eye, the soul would consist only of seeing. The soul could not exist except in and through the activity of the body.

Aristotle is thus seen to be the revolutionary thinker of his day. His teachings and writings are properly considered to be pioneer influences in the development of the sciences and scientific thinking. Not for centuries, however, was the full significance of this pioneer influence felt. Much that was known and written by him was lost to the civilization of Western Europe until the revival of learning in the Middle Ages. With due allowances for the inaccuracies of the knowledge of his day, the influence of Aristotle can be seen in the scientific activities of modern times. His particular beliefs may not be important or even valid today, but modern scientific attitudes and methods find in him one of their earliest advocates.

On the other hand, Plato's significance in modern life consists not so much in his direct contribution to modern thinking as in the indirect contribution he has made through the doctrines of the Christian religion which has borrowed freely from the concepts formulated and emphasized by him.

Christian Religion—Psychology of the Early Christian Church.—It is believed by many laymen that all the doctrines and teachings of the Christian church have developed since the beginning of the Christian era. This is now known to be an incorrect assumption. Many of the doctrines and teachings incorporated in the Christian faith have developed from, and are the modifications of, the philosophy and teachings that prevailed prior to Christian times. It is easy to understand that the thinkers and teachers of the early Christian centuries could not fail to be influenced by the knowledge and beliefs of their own time, and that the early Christian fathers had to choose between the different points of view expressed by Plato and Aristotle. It is also easy

to see why the modified teachings of Plato were the more acceptable to the thinkers and leaders of the early Christian church. The soul that was a substance could easily be related in their thinking to a divine soul, whereas it was difficult for them to conceive of an all-soul in Aristotle's sense of the term.

The early Christian writers were not primarily concerned with either the physiology or the psychology of man. Their sole concern was with that side of human life which deals with man's eternal salvation. Early Christian writers from the time of St. Paul to that of St. Augustine made no significant contribution to man's understanding of his own behavior. Having accepted the Platonist theory as the foundation of their own thinking about the soul, they proceeded to make man's soul the only thing about him that was of importance. Their very definition of soul, which follows that of Plato, makes it an extremely difficult concept to examine and study.

The Christian church did not encourage independent thinking, as the experiences of Copernicus and Galileo bear witness. The essential teaching of the church was that man was the most important object in the universe, and that the soul was the most important part of man. Anything that seemed to detract from the importance of man's soul was thoroughly disapproved. Only with the reintroduction of Aristotle's teachings into Europe was the reawakening of scientific thinking made possible.

The essential nature of the age-old conflict between science and religion is one of method rather than of content. The central concept of much of religious thinking is the assumption of revealed truth, truth that is complete and given with authority. Science, on the other hand, seeks to discover the truth through experience with a natural world, always remaining open-minded, never accepting any truth as complete or final. It is of some interest to speculate on what might have happened if the early church fathers had adopted the methods and concepts of Aristotle rather than those of Plato. It might reasonably be supposed that the whole domain of human behavior would not so long have remained outside the field of science. As it is, the influence of the early church was such as to delay a scientific explanation of

human behavior. Even today, both the layman and the professional churchman tend to deny the importance of the scientific method in the field of religion.

The Philosophical Beginning of Psychology.—Not until the latter part of the sixteenth century were philosophers found who were essentially concerned with man's behavior in a way that differed from the prevailing teachings of Christian theology. During the seventeenth and eighteenth centuries, however, many philosophers did attempt to explain man and his behavior rather definitely in terms of natural laws. Three of these who have had an important influence upon the later developments of psychology will be briefly mentioned: Descartes, Leibnitz, and Locke.

Descartes is often regarded as the first psychologist of the modern period. Descartes recognized two separate and distinct substances—mind and body. This dual nature of man, according to Descartes, did not particularly concern the religious considerations of the soul. In fact, it may be said that with Descartes psychology had at least begun to lose its soul.

Descartes knew more about anatomy than did those philosophers who preceded him, although his knowledge was very incomplete. He thought of the body simply as a machine. The mind or soul (he still used the word) was the thinking substance, but he recognized it as a substance nonetheless. To explain its control of the body, he thought of it as being located in what is now known to be the ductless gland called the pineal body. The mind was supposed to act upon the body by means of "animal spirits," defined as a "certain subtle air or breath" flowing from the brain through the nerves, which he believed to be hollow. This will be seen to be a rather shrewd forerunner of present-day descriptions of the nerve impulses.

> . . . According to Descartes, the mind sits in this organ and is moved by the animal spirits, and may also move the animal spirits when occasion requires. When one sees, a movement is started in the eye that drives the animal spirits inward over the optic nerve to the third ventricle; this inclines the pineal gland and produces in mind a picture of the object. On the other hand, when the mind desires to move a

member, it (the gland) can direct the animal spirits to the proper muscles and they produce the movement. Thus body acts on mind and mind acts on body directly.[4]

Descartes was surprisingly modern in many of his teachings. He was probably the first to recognize what is now called a conditioned response. He catalogued and classified the emotions, but he did not make much effort to work out the laws of mental action. Descartes' teachings plainly indicate a conception of mind-body relationship in terms of interaction of the two.

In Germany at about the same time, Leibnitz developed another theory of the relation of mind and body. This theory is commonly called parallelism. Leibnitz believed that every kind of thing in the universe was an entity in itself, and as such possessed both natural substance and thinking substance. He still recognized the soul as a substance, but he thought of animals other than human beings as also having this thinking substance. Like Descartes, he was not primarily concerned with the religious concept of the soul. He was more keenly interested in the way in which the soul was responsible for the behavior of the body. The important thing about Leibnitz's material substances and thinking substances was that they were entirely independent of each other except in so far as they existed simultaneously in each individual and in each thing. Whatever happened to one happened simultaneously in the other, but without any cause and effect relationship. Mind and body, as Leibnitz viewed them, were set going in the beginning by God and have gone on thus at the same rates ever since. He compared body and mind to two perfectly-timed clocks without any common control. Whatever was registered in one would be registered in the other. Thus, events in consciousness were parallel to, but otherwise unrelated to, the events in the body. In fact, Leibnitz was not very much concerned about the body. How the mind worked was his chief if not his only concern. His theory of parallelism is not seriously accepted today, but it had a very definite importance in his time.

About the same time, John Locke, an English philosopher,

[4] W. B. Pillsbury, *The History of Psychology,* New York, W. W. Norton & Co., 1929, p. 58.

dealt with the problem of man's behavior. He differed from his contemporaries in the one very important respect: he was concerned only with ideas, i.e., with mental content and with the problem of how knowledge is acquired.

One of the important points of Locke's teachings was that man has no ideas at all at birth. This was absolutely contrary to the generally prevailing belief at that time. He likened the human mind at birth to a clean sheet of paper, a *tabula rasa*. What was to be written on this clean sheet would be determined entirely by experience. This theory has had a very great influence upon later educational development.

Locke is called an empirical philosopher because he approached his problems through the observation of experience rather than in terms of pure deductive reasoning. The principal method of discovering truth in Locke's time was to take some earlier teacher as an accepted authority and from this point go wherever one would so long as one could proceed logically. Locke, therefore, made a very real contribution in terms of method as well as in terms of content of his explanations.

It is not important for the purpose here to trace in detail the development of any of these philosophical theories through the years that followed. The only reason for mentioning these three philosophers is that they were so largely responsible for the beginning of the present-day interest in understanding human behavior.

In explaining human behavior they were, in a sense, the forerunners of the scientific movement. In a fuller sense, however, they cannot be regarded as scientists so much as logicians. Their method was most certainly not experimental. They were the forerunners of what came to be called "arm-chair psychologists." The influence of this mode of thinking is much in evidence today. Oftentimes it is much easier to sit back comfortably and speculate and theorize than to submit the problem of human behavior to rigorous scientific experimentation. Such procedures are likely to be frowned upon by the scientist, but the arm-chair psychologist draws his consolation from the example of these and other eminent philosophers and is not much concerned about the out-

come of his thinking, except to make certain that it be exactly logical.

Psychology as a Science—the Beginning of Experimental Psychology.—The method of obtaining knowledge about man's behavior had changed from the purely deductive, logical procedure to one that was concerned principally with data resulting from the actual observation of man. It was only a step from this to the beginning of a truly experimental attack upon the problem of human behavior. This process of development was slow. In Germany during the last half of the nineteenth century, before a laboratory devoted entirely to psychology had been opened, certain physiologists in German universities began to be interested in experimental work in psychology. Most of the early experimentation had to do with sensation. This field was one that seemed to lend itself well to attack by physiologists who already possessed a good knowledge of the physical structure of the sense organs. These physiologists were interested in seeing what happened in the conscious experiences of the individual when the sense organs were stimulated in certain known ways.

Wundt was not the originator of the experimental method in psychology, but to him goes the credit for extending it greatly and making its importance generally recognized. He opened the first laboratory that was devoted exclusively to psychological experimentation. His contribution to the development of psychology consists in the great number of his original studies and in his training of many men from other countries in his laboratory.

Wundt was among the first to combine a sound knowledge of man's bodily structure with that of his behavior. His aim was to subject all hypotheses concerning man's behavior to rigid experimentation and to base his conclusions upon the results of these experiments. This marked a very distinct step forward.

Someone has facetiously remarked that first of all psychology lost its soul, then it lost its mind, finally it lost consciousness, and now it has only its behavior left. Some regard this as a tragedy. Actually it is an achievement that has taken ages to accomplish,

and closer examination will show that much of worth that has presumably been lost is actually retained in the complete concept of behavior.

An Outline Summary

1. Explanations of human behavior from earliest times to the present show considerable continuity and overlapping. Each succeeding explanation has been the product of two sets of factors:
   A. New discoveries and the advancement of knowledge.
   B. Previously accepted explanations based on older knowledge.
2. Several great influences have had their effect upon man's explanations of his behavior and each is still in some degree involved in present-day explanations.
   A. Animism assumes that many creatures, including man, are twofold in nature, possessing a physical body and a spirit which inhabits and controls the body.
   B. The Greek philosophers differed importantly among themselves but all attempted to explain human behavior systematically in terms of observed natural phenomena.
   C. The early Christian church was concerned only with the human soul and with spiritual behavior. The body and all of its behavior was regarded as of little importance except as it was governed by the soul which in turn was considered to be a fragment of a supernatural "all-soul."
   D. The philosophers of the Middle Ages developed logically deductive methods of explaining human behavior but employed very little controlled observation and experimentation as a check upon the truth of their explanations.
   E. Psychology became a science in the nineteenth century when it began to explain human behavior in terms of carefully controlled observations and experimentation, and sought its explanations in terms of predictable natural phenomena. Psychology is now established as a natural science but with certain characteristics of its own.

Problems for Further Thought

1. What are the outstanding similarities and differences between a superstition of a primitive people and a hypothesis employed by a group of scientists?

2. List a dozen or more superstitions that you have known to be taken seriously by one or more persons. Why do such superstitions prevail in a civilization such as ours?

3. Point out a number of resemblances of the animistic beliefs of primitive people to some of the beliefs and practices of current usage in our own civilization.

4. What are the advantages of an attempt to explain man's behavior as suggested in the previous chapter, i.e., in terms of stimulus and organic structure, over those involving a dualistic concept of mind and body such as most of those receiving emphasis in the past?

5. What are the most important reasons why man still prefers to use the term "mind" in the animistic sense instead of more readily choosing the newer point of view?

Suggested Readings

No readings are provided for this chapter. It is intended that it shall serve as a means of furnishing a background of understanding and a kind of perspective for the age-old problem confronting man in his attempts to explain, predict, and control his own behavior. The material contained herein may reasonably serve such a purpose without more extensive reading. Here the only purpose is to develop an appreciation of the magnitude and the difficulty of discovering how man has arrived at his present point of view in explaining himself.

Chapter 3

WHY DO CERTAIN BEHAVIOR TRAITS SEEM TO RUN IN FAMILIES?

Some Family Traits of Behavior.—Family traits of behavior are very common. Sometimes they take the form of minor peculiarities of personality. Again they may assume such major proportions as to mark all or nearly all members of the family group in some conspicuous manner. Experience with one's own family will furnish illustrations of this fact. To ask why these behavior traits run in families is to begin the study of the way in which human behavior is determined and controlled.

Social and genetic studies have been made of certain families. Some of these families have been highly esteemed socially, while others have ranked very low in the social scale. The Jukes and the Kalikak families have been contributing social problems to their communities for several generations. On the other hand, there is the Edwards family in America and the Darwin family in England which have freely supplied their social groups with splendid accomplishments.

The question arises: What explanation can be given for the facts which have been scientifically observed and carefully recorded? Are such behavior traits really inherited, or are they the result of other factors which are inherited? Or finally, can they be accounted for without calling heredity into the question at all? The answer to these questions and to others like them will require some knowledge of human inheritance. It will also require a knowledge of the way environment affects those biological factors which in themselves are determined by heredity.

A lively controversy has been raging for years between two groups of scientists. One would emphasize the importance of the individual's heredity and minimize the influence of the environment. The other group would reverse this emphasis. As

is usually true in controversies, the truth probably does not lie at either extreme. No factors concerning heredity have practical significance except in terms of the individual's environment. On the other hand, no factors of environment can be completely understood unless they are also viewed in the light of the individual's heredity.

The first question to be considered is what actually can be inherited. The knowledge of human heredity possessed by the average person is usually limited to the old inadequate definition of heredity as the resemblance of one generation to another. Ordinarily heredity is not much concerned with fundamentals such as the number of arms, legs, or eyes.

> In fact, these things are so much a matter of course that they are not even thought of as being a part of the child's heredity. No one remarks that John has two legs just as his father has, or that Jane resembles her mother in having an ear on each side of her head. But John may be said to have unusually long legs like his father or Jane to have particularly small and beautiful ears like her mother.[1]

Knowledge of the manner and extent of inheritance has been gained by giving particular attention to individual differences. Mendel, in his monastery garden, noticed that some pea vines were characteristically short and other pea vines were tall. When two differing strains were crossed, he watched to see which characteristics were present in the offspring. This is only an illustration of the procedure basic to one line of present-day knowledge of inheritance of traits. With man the control of mating is, of course, outside the realm of laboratory technique. Moreover, the number of offspring is small, and the human life span is very long. Therefore, it is necessary to note the presence of certain characteristics in several generations of one family stock and to check these findings with what is otherwise known about the nature of inheritance.

The zoölogist is unable to explain how behavior can be inherited unless behavior is defined as the responses of the bodily

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[1] Paul Popenoe, *The Child's Heredity*, Baltimore, Williams & Wilkins Co., 1929, p. 12.

mechanism. In other words, *behavior traits,* as such, cannot be inherited. The resemblance of the behavior of children to that of their parents may, therefore, be accounted for in part in terms of the similarity of structure, which in turn may be partly due to inheritance. In reality, not even the bodily mechanism is inherited. Rather it is only the possibility of the development of specific kinds of structure which is inherited.

> The child does not inherit any definite thing; he inherits merely a *potentiality of developing to a certain degree under normal conditions.* He can never exceed the limits of his potentiality, but he may and often does fall short of them. He does not get the most out of his heredity because the conditions are not favorable to the development of his possibilities. This is fortunate if the possibility is an injurious one, unfortunate if the possibility is a useful or desirable one.[2]

The really surprising thing is that there is so little difference in the characteristics of successive generations, and not that there are a few striking similarities. This will be made clear through a better understanding of the chance events that take place in germ cells during the process of maturing. The variations that appear in both anatomical traits and behavior traits from generation to generation are of two kinds. First, there are the slow changes that take place over thousands of years, and which constitute what is sometimes called evolution. Second, there are the changes which cause variations within each species. These are due to the combination of characteristics of the parents, represented in their germ plasm. It is this last group of variations that is of particular importance in the tracing of family resemblances. In order to understand how these parental characteristics may be combined, it will be necessary to have an elementary understanding of the process of development and fertilization of the germ cells.

The Biological Mechanics of Inheritance.—Each child has its beginning in the union of the germ cells of its parents. These

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[2] *Ibid,* pp. 5–6.

germ cells contain bits of protoplasm called chromosomes, which are the real bearers of heredity. Each chromosome is composed of many units, called "genes" or "determiners." The latter term is especially significant, since these genes actually determine the potentialities of the individual. Each germ cell of a human being has 24 pairs of these chromosomes.[3] This is a human characteristic. Other species of animals may have other numbers of chromosomes, but they always occur in pairs. When one cell (the ovum) unites with another cell (the spermatozoön), the new cell would have double the original number of chromosomes unless something happened to prevent it. What actually happens is that, before the germ cell reaches the stage where fertilization can take place, the 24 pairs of chromosomes in the cell are reduced to 24 chromosomes, by the division of each pair. In the process of fertilization the chromosomes are again paired. However, each pair is now made up of one chromosome from each of the parent cells, so that the fertilized ovum, which is the beginning of a new individual, has the normal 24 pairs characteristic of the human being, supplied equally by each parent.

Chance plays an important rôle in determining the combination of the chromosomes in the fertilized ovum from which the new individual develops. The factors of chance operate at two points. In the first place, chance determines which particular chromosomes of each pair shall go to the cell which is to take part in fertilization. Although the chromosomes of each pair are similar, they are not always identical. One member of the pair may carry certain determiners in a dominant manner, while the other may carry them in a recessive manner. Sometimes, of course, both may be dominant or both recessive, but unless they are identical, the two germ cells which result from the division will not have identical possibilities of determining structure. Chance again enters as a determining factor in the process of fertilization itself. Of the large number of germ cells which are actually matured during the lifetime of either a man or a woman, only two are involved in each process of fertilization from which

[3] There are actually 23 pairs and an odd one in one sex and 24 pairs in the other, but for the purpose here they can be conveniently considered as 24 pairs.

an embryo develops.[4] Chance alone seems to determine which of the countless number of different germs cells will be selected for fertilization.

As an example, let us consider a simplified case in which only three pairs of chromosomes are involved. For convenience let these three pairs be called Aa, Bb, and Cc. When the reduction referred to above takes place, what possible different combinations of chromosomes may result? In such a case there are eight different possible combinations: ABC, ABc, AbC, Abc, aBC, aBc, abC, and abc. The same process takes place in both the male and the female. In fertilization therefore, there is the possibility of *any* one of these eight different combinations in the male germ cell uniting with *any* one of the eight different combinations in the female germ cell. Thus there would be possible 64 combinations of chromosomes in the fertilized ovum having only three pairs of chromosomes.

This is shown graphically in Figure 2. It may also be shown by the formula $(2^n)^2$ where n is the number of pairs. If n equals 3, as in this case, the computation of the formula yields 64, just as in Figure 2. It would be impractical to show the number of combinations in the case of the human germ cell by a process similar to Figure 2 because such a procedure would be extremely complex. However, it is possible to compute how many combinations there would be by means of the formula which in this case would be $(2^{24})^2$. Such a number is incomprehensibly large, being approximately 281,000,000,000,000.

As will be seen by an examination of Figure 2, not all of the 64 combinations are different. For example, all of the small squares from the lower left-hand corner to the upper right-hand corner are identical. However, of the 64 possibilities, 36 are different, and in the human being there would be more than 141,000,000,000,000 different possibilities. The significance of all of these meaninglessly large numbers is simply that the chance that brothers or sisters will have exactly the same inheritance can be discounted entirely.

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[4] In the case of multiple identical siblings, only two germ cells are involved, regardless of the number of siblings.

MALE
Aa Bb Cc
WHEN REDUCED BECOMES
ABC, ABc, AbC
Abc, aBC, aBc
abC, or abc

when *any* one of these UNITES WITH *any* one of these

FEMALE
Aa Bb Cc
WHEN REDUCED BECOMES
ABC, ABc, AbC
Abc, aBC, aBc
abC, or abc

IT FORMS A FERTILIZED OVUM WITH ONE OF THE 64 COMBINATIONS SHOWN BELOW.

Male \ Female	ABC	ABc	AbC	Abc	aBC	aBc	abC	abc
ABC	AABBCC	AABBCc	AABbCC	AABbCc	AaBBCC	AaBBCc	AaBbCC	AaBbCc
ABc	AABBCc	AABBcc	AABbCc	AABbcc	AaBBCc	AaBBcc	AaBbCc	AaBbcc
AbC	AABbCC	AABbCc	AAbbCC	AAbbCc	AaBbCC	AaBbCc	AabbCC	AabbCc
Abc	AABbCc	AABbcc	AAbbCc	AAbbcc	AaBbCc	AaBbcc	AabbCc	Aabbcc
aBC	AaBBCC	AaBBCc	AaBbCC	AaBbCc	aaBBCC	aaBBCc	aaBbCC	aaBbCc
aBc	AaBBCc	AaBBcc	AaBbCc	AaBbcc	aaBBCc	aaBBcc	aaBbCc	aaBbcc
abC	AaBbCC	AaBbCc	AabbCC	AabbCc	aaBbCC	aaBbCc	aabbCC	aabbCc
abc	AaBbCc	AaBbcc	AabbCc	Aabbcc	aaBbCc	aaBbcc	aabbCc	aabbcc

Figure 2. The Possibilities of Variation in a Trait Dependent Upon Three Pairs of Chromosomes Which Show Mixed Dominance in Both Parents

The possibility of considerable variation in the offspring of two parents is clearly evident in everyday observation. Yet this principle of variation operates hand in hand with another important general principle which may seem at first to be quite contradictory to it. Despite the wide range of variations possible, it is nevertheless true that "like tends to beget like." There is a greater probability that children will be like the average of their parents than that they will resemble any other individual. The important truth follows that the kind of family traits that go into the mating will determine the nature of the traits of the offspring. Inbreeding may, therefore, be generally good or generally bad, depending upon the qualities of the family stock that enter into the process.

"Social Inheritance."—The term "social inheritance" is frequently used to designate certain aspects of family resemblance that cannot be accounted for in terms of biological factors. There are probably some dangers in the use of such a term that need to be guarded against. Actually, there is no such thing as the transmission from one generation to the next of any social factors by means of the germ plasm. The kind of inheritance here involved is much the same as that implied in saying that Mr. Brown inherited his farm from his father. The term "inheritance" may thus be used with two somewhat different meanings, and care must be exercised in discriminating between the two. Both of them are important in answering the question which heads this chapter.

Do the offspring of a Jukes or a Kalikak family inherit the socially undesirable behavior which is so much in evidence in the studies made of them? The answer will depend upon how the word "inherit" is used. They cannot inherit any kind of behavior in the biological sense, but they may biologically inherit very limited potential capacities for behaving in a way that society generally prizes. Their "social inheritance" is, of course, undesirable, and coupled with limitations of biological inheritance it makes an unfortunate combination. Both of these sets of factors must be considered in seeking an explanation of their behavior.

Impossibility of Inheriting Characteristics Acquired by Parents.—To the above-mentioned facts concerning heredity must be added certain others having to do with the continuity of the germ plasm through successive generations. In all higher forms of animal life the germ plasm develops separately from the rest of the body cells. When the fertilized germ cell begins to develop, it divides into two cells, each with chromosome content exactly like itself. Each of these in turn divides, and the process is repeated several times before any differentiation of cell structure begins. Before differentiation does begin, very early in the life of the embryo, one of these cells, which has a chromosome structure exactly like that of the fertilized cell from which the embryo began, is left in an undifferentiated form. Eventually, through further development, this gives rise to the gonads of the individual, from which the germ cells will later develop. The body develops anew for each generation, while the germ plasm continues from one generation to the next. The statement is sometimes made that one is more nearly related to one's grandparents than to one's parents. This is a figurative statement, of course, but it does throw light upon the frequently observed phenomenon that children in a family may sometimes rather strikingly resemble a grandparent in one or a few characteristics.

The facts of heredity and development all point to the impossibility of transmitting biologically from one generation to the next those characteristics that are the result of accident or habit. The nature of the future germ cells is determined at the moment of fertilization, and hence the possibility of transmitting characteristics acquired as a result of experience simply does not exist.

A similar problem is involved in "prenatal" culture, which was, at one time, in good medical repute. According to this belief, the mother could influence the future development of the unborn child by what she thought and did during pregnancy. This is now recognized as impossible. The only way in which the activity of the mother can influence the unborn child is by means of substances which could be passed through the placenta to the blood stream of the child. Unless the mother's activity produces

such substances in her own blood stream, no such influence would be possible.

Characteristics of the Behavior and Appearance of Twins.— It seems hardly necessary, in view of what has just been said, to point out that there may be a wide variation in the traits of structure inherited by children of the same parents. This would mean that the behavior traits of children in the same family might also readily be expected to differ to a considerable degree, since differences in structure might easily account for differences in behavior.

In the human species, most births are single. Twinning is not at all unusual, but cases in which more than two children are born at a time are exceedingly rare. These plural births are of two kinds. *Monozygotic* or identical twins are individuals that are presumably born as a result of the fertilization of a single ovum. There seems to be excellent evidence that the Dionne quintuplets are identical, all having developed from the fertilization of a single ovum.[5] The *polyzygotic* or non-identical plural births are matured from two or more ova fertilized at approximately the same time. In the identical twins the division of the original fertilized ovum takes place within a very short time after fertilization and before differentiation of structure begins. The two resulting parts each develop as an individual, but since they were derived from a single fertilized ovum they must have identical heredity. In the case of non-identical twins, the situation is exactly the same as that of brothers and sisters. The only difference is the accident of being born at the same time. They may differ in their heredity as much as any other children born of the same parents. Identical twins are always of the same sex; non-identical twins may be of the same or opposite sex.

A study of similarities in twins, as compared with other children in the same family, has been a very fruitful means of discovering the effects of heredity. The environment of twins is, in most cases, more nearly alike than is the environment of chil-

[5] W. E. Blatz, *et al., Collected Studies on the Dionne Quintuplets,* Toronto, University of Toronto Press, 1937.

dren in the same family born at different times. These similarities of environment may lead to confusion, since parents often emphasize the similarities of twins in their treatment of the children, especially in their dress, in providing toys, and in other matters of family care. This similarity of environment may have something to do with the similarities of behavior of the individuals as they grow up. At the present time it is not clear, even after extensive study of twins, exactly how much the hereditary factors contribute to the appearance of family behavior traits in successive generations.

Recently Newman [6] and associates at the University of Chicago have been studying the mental traits of identical twins who have been raised in separate homes. Up to the present time some eight or nine pairs of such twins have been studied rather carefully. In all these cases the twins were separated in early life and frequently did not even know that they had a twin until the early formative period of life was past. These twins have been measured in terms of intelligence, emotion, and temperament. Remarkable similarities have been found in the matter of intelligence, but the similarities of emotions and temperament are not so great. This may be due partly to the fact that the instruments for measuring emotions and temperament are not so reliable as those for measuring intelligence. On the other hand, it may be possible that emotional and temperamental differences can be more readily influenced by environmental factors.

A Study of Quadruplets.—The Keys quadruplets, born in the United States, have furnished psychologists with very interesting data bearing on the problem of inheritance. They have been extensively studied, and rather exact measurements have been made of their psychological and physical traits. A most complete series of mental and physical measurements was made at the time they were twelve years of age. Mona and Roberta are apparently identical or monozygotic twins. They are brunettes and in general looked remarkably alike at the age of twelve. They differed

[6] H. H. Newman, "Identical Twins," *The Eugenic Review,* XXII, April, 1930, pp. 22–23.

THE KEYS QUADRUPLETS

Aged 5 months, 2 years, 12 years, and 16 years. Can you pick out the identicals, Roberta and Mona, and the non-identicals, Mary and Leota, from the description in the text?

THE KEYS QUADRUPLETS

The pictures on this and the preceding page were furnished by the courtesy of *Look,* in which magazine they appeared with several other pictures of these quadruplets on January 18, 1938.

only slightly in physical measurements. Mary and Leota, the other two girls, differed very much in their appearance. Leota was fair-skinned, light-haired, shorter, and lighter in weight than the other three. Mary was dark and resembled Mona and Roberta in general physical proportions and appearance, but she was readily distinguishable from these two. In intelligence, Mona, Roberta, and Leota were much alike. All three were distinctly superior individuals. Mary was also above the average in intelligence, but was somewhat different in this respect from her sisters. Their records in the elementary school showed a great similarity in the primary grades. Their achievement test scores in the upper grades also showed marked similarities for Leota, Mona, and Roberta. These three were distinctly accelerated in terms of achievement. Mary also was slightly accelerated, but the achievement test scores seemed to confirm those of intelligence.

Brintle concludes in part as follows:

> Roberta and Mona are strikingly alike in form of face, color of hair and eyes, and in bodily build. Mary and Leota are distinctly different from each other in these respects. Mary resembles Roberta and Mona but has a decidedly different form of face and bodily build. Leota, with her blond hair and blue eyes, and distinctly different form of face and bodily build, is no more like her three sisters than if she were an ordinary sibling. It seems, therefore, that Roberta and Mona are identical twins and that the four individuals developed from three eggs.
>
> Assuming Roberta and Mona to be identical twins, a comparison may be made of the results of their traits that were measured. Although there were slight differences in the physical measurements, the two are as nearly alike as identical twins ordinarily are. From the results of the series of measurements represented here, we do not find any striking differences between Roberta and Mona. On the other hand, the results of both the achievement and the psychological measurements show a marked degree of similarity. It seems, therefore, that with this particular set of twins, random and environmental influences have had no marked effects on the traits measured.
>
> In studies of identical twins, their identical similarities are sometimes attributed to the identical environment. Therefore, from the study of a set of quadruplets in which we have both a set of the identical twins and a set of fraternal twins who were in reality under the

same environmental conditions, it appears that random and environmental influences have had very little or no effect in causing the identical twins to grow more unlike. Furthermore, it does not seem that the fraternals have become more like the identicals, but rather the factors of heredity have been most influential.[7]

Inheritance of Special Talents.—It is frequently noted that certain special abilities or so-called "talents" appear successively in several generations of the same family. Can this appearance best be accounted for in terms of inheritance or in terms of environmental conditions? It will be worth while to consider one special talent and attempt to apply to it the principles of biological heredity. A very appropriate one for this purpose is musical talent, because it has been studied in relatively great detail. Seashore [8] and others have succeeded in picking out a number of fairly simple elements which, taken together, may constitute what is called musical talent. The analysis, while fairly complete, probably does not take into consideration certain elements as yet not clearly recognized. One or two of the elements which have been isolated will suffice as illustrations.

The first of these is pitch discrimination. Two tones, differing in pitch by only a small amount, are sounded one at a time with only a short interval between. Individuals are then asked to indicate whether the first tone had a higher or lower pitch than the second. A few persons can discriminate correctly every time a comparison is made; others will insist that the same tone has been sounded twice. If one of the tones is changed so that the difference becomes greater, more persons can discriminate correctly. If the difference is made large enough, anyone who can hear the tones will be able to make a correct discrimination. A few individuals can distinguish between the pitches when they are very nearly alike. For others there must be a large difference before they can discriminate surely. The interesting

[7] Shirley L. Brintle, "Mental and Physical Measurements of a Set of Twelve-Year-Old Quadruplets," *Pedogogical Seminary and Journal of Genetic Psychology*, Vol. 39, p. 100. These girls are now adults and have recently graduated from college. The similarities and differences shown when they were twelve in general seem to be about equally evident today.

[8] C. E. Seashore, *The Psychology of Musical Talent*, New York, Silver, Burdett & Co., 1919.

thing about this phenomenon is that training produces very little improvement.

The organic basis of this difference is not definitely known. It is supposed to be due to minute differences in the structure of the inner ear. These differences, whatever they are, might very readily be accounted for in terms of factors of inheritance. To this extent then, one may be said to inherit varying degrees of this ability, which undoubtedly is an important attribute of musical talent. However, it is a potentiality only. Certainly not all individuals who may have inherited it to a degree that enables them to make fine pitch discriminations develop recognizable musical talent, but it can readily be understood that a person who lacks this potentiality would have very real difficulty in playing any musical instrument that demanded fine pitch discriminations.

Not all the factors measured by Seashore's test are so little influenced by training; hence musical talent is not entirely determined by heredity. Tonal memory, consonance, and discrimination of intensity are elements of musical talent which do show the effects of training. Even in these cases heritable differences in structure are of basic significance in musical behavior. The inheritance of what might be called musical talent probably depends upon many hereditary factors. The potentiality is all that can be accounted for in terms of inheritance. A musically talented individual, therefore, is the result, first, of a combination of chromosome factors which have resulted in the development of structural characteristics that make possible the various elements of talented musical behavior. In the second place, the appearance of such musical talent is dependent upon desirable environmental stimulation. Different degrees of inherited potentialities of this sort might require different types and amounts of environmental influence.

In the case of the musically talented family, the fact that the parents were talented would mean that they had a bodily structure which made such behavior possible. This would increase the probability of their children having a structure somewhat similar. Moreover, the environmental stimulation in such a family would do much to insure the development of the musical

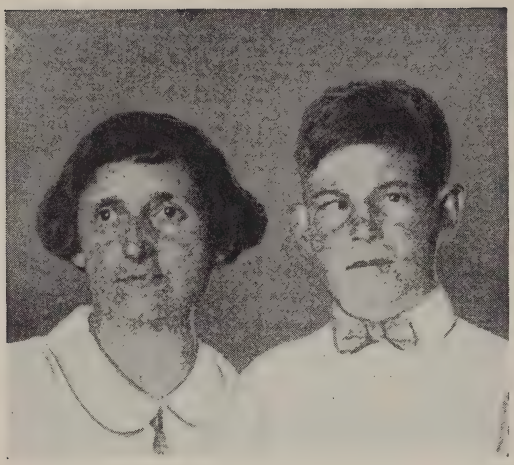
ability to a point somewhere near the highest level of possibilities determined by inheritance. It is a characteristic of ordinary human observation that instances of the appearance of such a trait as musical talent in successive generations of a family are looked for and remembered, while other members of the family who do not carry on the family tradition are easily overlooked.

Other Inherited Traits Which Are Particularly Likely to Influence Behavior.—Three groups of traits will illustrate how the behavior of an individual may be potentially determined in part by inheritance. These groups show progressively more complex combinations of factors of inheritance.

1. Traits Due to Known Oddities of Inherited Structure. Color-blindness is an inability to distinguish certain colors. It exists in two varieties and in varying degrees of completeness. The most common kind is called red-green color-blindness. Persons affected with this particular sort of incapacity are more or less incapable of distinguishing certain shades of red from certain shades of green. In the other kind there is complete inability to recognize colors. Very few persons are thus afflicted. It is presumed that such persons see only what the individual with normal color vision recognizes as different shades of gray.

Color-blindness is definitely known to be due to an absence of certain minute structures in the retina of the eye. It is not a disease, although it may be called a defect. The condition is heritable and behaves as a sex-linked recessive. This means that it is recessive in the same way that blue-eyedness is recessive to dark-eyedness. It is sex-linked in the sense that it appears to be linked with the genes in the chromosome which determines the sex of the offspring. The pattern of inheritance is a peculiar one and involves an apparent skipping of the males of every other generation.

Other relatively simple oddities of human structure which in some degree might influence behavior are congenital dislocation of the hip, some forms of dwarfism, several varieties of short-fingeredness, stiff-jointed fingers, a condition of extreme brittleness of all the bones in the body, an extra digit on each hand and



FOUR SQUINTERS IN ONE FAMILY

Mrs. C. S., age 46, had had 14 children, of whom 9 were living at the time of this study (*Journal of the American Medical Association,* May 22, 1926). Her right eye had always turned out. Her three youngest children, shown above, have eyes that turn in. The boy's right eye has been turning in since age 2; the older girl's right eye since age 2; the younger girl's left eye since age 1. Although no history of strabismus could be found on either paternal or maternal side of this family, the tendency is found from careful studies to be inherited. Photograph from Dr. Frank H. Rodin, Stanford University Medical School, San Francisco, Calif. (By permission from Paul Popenoe, *The Child's Heredity,* Williams & Wilkins Co., Baltimore, Md.)

foot, hernia, and some forms of harelip and cleft palate. The list could be greatly extended. Some of these peculiarities are more clearly inherited than others. Some behave like dominants, while others have the characteristics of recessives. Many, if not most of them, seem to depend upon the cumulative effect of two or several genes in different chromosomes. However, all are heritable in the strictly biological sense, and the presence or absence of any one might have a definite effect on the behavior and personality of the individual who inherited them.

2. Dominance. A somewhat more complex behavior characteristic is the matter of dominance of one side of the body over the other, most commonly manifested in what is called handedness. In all civilizations of the world most persons show a preference for the use of the right hand. This trait appears in such widely scattered places and in so many kinds of civilizations that it would be very difficult to account for it in terms of learning alone. Moreover, such dominance is usually not limited to that of hand and arm but involves many parts of the body. Until recently it was believed that man was the only animal to show such dominance. However, some evidence has recently been brought forth to indicate that even lower animals have something resembling the human preference for the use of one side of the body.

Preference in handedness is usually well recognized by the individual. Some are very dominantly right-handed while others show equal dominance of the left hand. However, a very large number of individuals are not so completely one-handed, using some implements with the right hand, and others with the left.

The matter of right-eyedness or left-eyedness is another interesting feature of dominance. Many more individuals are dominantly right-eyed than left-eyed. It is apparent, too, that the degree of dominance is stronger in some individuals than in others. It is possible that many readers have never been aware of the fact of dominant eyedness because so little social attention is paid to it as compared to handedness.

Left dominance seems to appear much more frequently among the members of certain families than in others. It is not known exactly what is the nature of this heritable tendency nor just how

it behaves. However, even after all allowances are made for the learned elements in dominance, there still remains considerable evidence to show that this trait is inherited. It may be a matter of inherited brain structure, although this has not been completely established.

3. Temperament. A still more complex behavior trait commonly goes by the name of temperament. This is not a unitary trait, but a complex of several simpler components. Neither is it exclusively a result of hereditary potentialities, for learning is undoubtedly of great importance in its development. A case in point is that of a father who assumes that his son's violent temper is the outcropping of a family trait. Such a possibility may exist. But the evidence is not entirely convincing when the father assumes that the family trait in question comes from the wife's family stock. Fortunately, more reliable evidence than this is available.

It is frequently noted that two children in the same family, although not far apart in age, show distinctly different temperaments. Consider the case of two children four and six years old in the same family. The four-year-old is a lively, vivacious, talkative person. The six-year-old is distinctly different in temperament, being reserved and talking very little. The behavior patterns of these two children have been characteristic throughout their lives. Both are apparently equally bright, but there is a distinct difference in their personalities which cannot be accounted for in terms of age or known differences of experience. It is possible that the differences manifested in such a case are actually due to inherited differences in structure. Such differences may easily be accounted for in terms of the chance combination of genes in the fertilized ova from which these two children of the same parents have sprung.

Much more noticeable differences appear when the children of different families are compared. In such a case, differences in family environment and in procedures of child training must be considered. However, much the same variety of differences is noticeable even in orphanages where the environment is somwhat similar for all individuals. In all such cases observation may be

faulty or actually misleading. The assumption that family or racial differences in temperament do exist may cause observers to look for those data that seem to prove the assumption. At the same time, it may cause some rather obvious exceptions to be overlooked. Nevertheless, it is possible that the exceptions here noted may be due to the already emphasized fact that all children born of the same parents do not have the same hereditary potentialities.

An additional difficulty is that human beings possess an organism which is more easily modified by its reactions to environment than that of any of the lower forms of animal life. The geneticist is compelled to get much of his information about temperamental traits from the study of lower animals. This he must supplement by the accumulation of all data available from observations and measurements of human beings. Some of the data used by the geneticist in making his conclusions will be summarized from Popenoe.[9] These, in turn, are drawn from a wide variety of original sources.

In the first place, distinct characteristics of temperament make their appearance in the individual's behavior during very early childhood and seemingly even during the prenatal period of life. Secondly, temperamental differences are noticeable in different family strains of the same animal species. For example, white rats are normally lacking in wildness and savageness, whereas wild rats, *even when raised from birth in captivity,* manifest these traits to a marked degree. Thus, the wildness and savageness cannot be accounted for entirely in terms of the life experience of the rats. Offspring of a white rat and a wild rat raised in the entire absence of the wild parent show wildness and savageness approximately midway between the behavior manifested by the parents. A recent experiment with tame white mice and wild mice show somewhat similar results.[10]

In the third place, it may be noted that racial differences in temperament are extremely difficult to explain in terms of en-

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[9] Popenoe, *op. cit.,* Ch. XX, p. 197 ff.

[10] F. A. Moss, *Comparative Psychology,* New York, Prentice-Hall, Inc., 1934, Ch. III, C. P. Stone, pp. 58–59 ff.

vironmental and cultural conditions. Students of Negro life in the remote parts of the deep South, where the Negro stock is almost pure, have noted some distinct racial characteristics of temperament of the Negro as compared with the temperamental characteristics of whites of a similar socio-economic level.

A fourth fact of importance is that an outstanding temperamental trait is occasionally noted in successive generations, with about as great frequency as would be expected for corresponding anatomical traits. The marked resemblance of temperamental traits in identical twins has frequently been noted. In such cases it is difficult to determine how much of the resemblance is due to heredity and how much to similarity of environment. The temperamental and emotional similarities of identical twins are too striking to be readily accounted for in terms of environmental influences.

Finally, there is the association of types of temperament with types of bodily structure. Different types of bodily structure are recognized as being largely determined by heredity. It is only fair to note that much of the evidence is not very clear and there is considerable confusion about the classifications employed in describing bodily types. The same is true of types of temperament. However, some studies suggest that temperamental traits may frequently be found in their extreme forms in individuals who have distinctly different bodily structure. Introversion (preoccupation with one's own inner mental life) according to Popenoe, tends to be found most frequently in tall, thin individuals. Extraversion (preoccupation with external affairs and things) seems to go more frequently with rotund, thick-set persons.

Although the modern scientist's knowledge of the function of the endocrine glands is still incomplete, the evidence available seems to point clearly to the conclusion that temperamental differences are related to differences in the functioning of several of these glands. Such functional differences may depend upon structural differences and these in turn may have an hereditary origin. Therefore, heredity may conceivably have a distinct bearing upon the appearance of temperamental traits in successive generations of a family.

The Heredity-Environment Problem.—In conclusion, the problem of the relative importance of heredity and environment needs another word. It is not a question of which one is the more important in determining the behavior of the individual. Rather, it is a question of the way in which each influences the other. No one can exist without either a reasonably satisfactory heredity or a reasonably adequate environment. The very fact that the individual is born and lives throughout childhood and later life implies that both heredity and environment have at least been sufficient to satisfy the minimum requirements of life. The real relationship of those two sets of factors might be stated somewhat in this manner. Heredity determines the potentialities within which the individual's development may proceed. Environment determines the degree to which the individual develops within the limits set by heredity. The importance of both heredity and environment must be recognized. All changes occurring in the behavior of the individual must be brought about by means of environmental stimulation. On the other hand, no amount of environmental influence can produce in the behavior of the individual a change that transcends the limits determined by heredity.

An Outline Summary

1. Inheritance in the biological sense must not be confused with the frequently employed figurative use of the term "social inheritance."
2. Behavior traits can be inherited only in the sense that behaving structure can be influenced by inheritance.
3. Heredity can only determine the limits within which bodily structure can develop.
4. The great complexity of the human germ cells and of the processes involved in their development and fertilization make it probable that the children of two parents will inherit somewhat different potentialities of structure and hence of behavior.
5. The experience of the parents cannot influence their germ cells nor the inherited characteristics of their offspring.
6. The importance of the influence of both heredity and experience is well indicated by the study of the behavior of identical twins as compared with that of fraternal twins.

7. Experience, as it is determined by the environment, may modify any behavior trait within the limits set by heredity.
8. The "heredity vs. environment" problem is really not so much a question of which is the more important, as it is one of determining how each set of factors influences the other.

Problems for Further Thought

1. In the light of the discussion contained in this chapter, what will determine the advisability of cousin marriages?

2. Briefly describe some behavior trait, such as walking or vocal inflection, that is a peculiarity of some family you know. Then enumerate some of the difficulties involved in determining the relative influence of heredity and environment.

3. Briefly describe some family talent known to you, such as artistic ability. What evidences can you discover that this is dependent upon biological heredity? Upon environmental influences, particularly in early life?

4. The question is often asked: "Is insanity inherited?" If insanity is defined briefly here as so gross a deterioration and maladaption of the individual's behavior as to endanger the safety and welfare of the individual or of society, what must be the nature of the answer in the light of the discussion found in this chapter? What might be the actual hereditary basis of such maladjustment? What kind of environmental influences must also be considered?

5. Tests show many adults who have a left-sided dominance, but who shake hands, write, and do other things of a social nature with the right hand. Show how this may illustrate the modification of innate behavior tendencies through environmental influences. Some persons do not yield easily to social pressures. To what extent may this indicate the differences in the limits of modifiability set by inheritance?

6. Such a complex trait as musical talent seems to depend upon and include a fairly large number of specific traits which may be unrelated among themselves. Show how the appearance of such a talent may depend upon both inherited capacities and fortunate stimulating situations.

7. Since the determiners of a child's heredity are fixed at the instant of fertilization, of what importance is it to the teacher or parent to know something about the child's inheritance?

8. Since there is nothing that can be done about changing the heredity of a child after conception, why is it particularly important that the parent and teacher should understand the significance and limitations of the influence of environment?

9. Explain how such behavior patterns as personality and temperament can be influenced by heredity.

10. Of what significance for the problem of the relationship between heredity and environment is the study of the behavior of fraternal and identical twins?

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Chapter 4

SOME WAYS IN WHICH BEHAVIOR DEPENDS UPON STRUCTURE—WHAT ARE INSTINCTS?

Characteristics of Instinctive Behavior.—A casual observation of the behavior of many species of animals makes it evident that all members of a given species behave in some respects remarkably alike. There seems very little, if any, possibility that such behavior can be properly thought of as entirely learned.

It is a well-known fact that mother cats normally show great solicitude for their kittens for a period of several weeks after the kittens are born. Cats do this with their first kittens even when they have never had the opportunity of learning. If they are deprived of their kittens, they frequently show a kind of behavior that to the human being is most readily interpreted as mourning. It may last several days or even weeks. Sometimes they have been known to "adopt" either kittens from another litter or the young of some other animal. They have even been known to nurse young rats and squirrels, whereas the normal behavior of a cat would be to eat them. Such "maternal instinct" appears among a large number of mammals. The question arises: Why do these mother cats behave in such a way?

Among human beings instinctive behavior is not so obvious, but there are some behavior patterns which appear early in life without opportunity for learning. These are called either reflexes or instincts. If a small rod slightly larger than a pencil is placed in contact with the palm of an infant a few days old, its behavior can be predicted. The thumb and fingers close tightly around the rod with the thumb on the same side as the fingers. This is called the grasping reflex and it may be strong enough to support the entire weight of the infant's body. Why does the infant grasp the rod in this particular manner and with such evident tenacity? It will be the function of this chapter to answer this question and

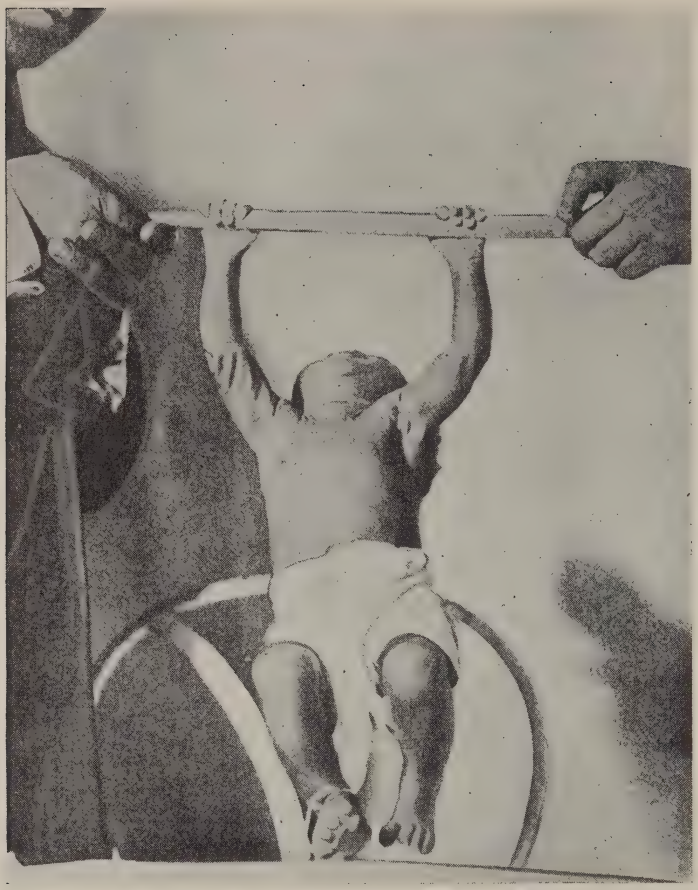
similar ones about the behavior traits of lower animals and human beings.

A variety of explanations have been offered by psychologists to account for the behavior noted in these illustrations. The word "instinct" is frequently employed by those who present explanations that differ widely. Hence, to say that the behavior is instinctive is not a satisfactory explanation. From the psychologist's point of view, to say that an act is the result of an "instinct" is often equivalent to saying that the cause of the act is unknown.

Most descriptions of instinct have two characteristics in common, unlearnedness and universality. The lower animals are supposed to have much of their behavior made up of instincts. Man, too, is often said to have a long list of such unlearned, universally appearing behavior traits. Instincts and reflexes are usually thought of as inborn tendencies to make certain responses under certain conditions. These tendencies are frequently regarded as mysterious and even as outside the realm of natural law.

It has been shown that organic structures of the body may be influenced by heredity. This offers a partial explanation of the similarity of behavior of successive generations of the species. As a means of understanding the real nature of instinctive activity, it is necessary to examine first the simplest of these acts.

Reflexes.—Reflexes resemble instincts in that they manifest themselves in the absence of opportunity for learning. They are universal within a species. The chief difference between them lies in the fact that reflexes are less complex than instincts. The grasping behavior of the human infant should be regarded as reflexive rather than instinctive, since the name reflex is usually reserved for such relatively simple activities. Reflexive activity usually involves the movement of a localized part of the body. Another well-known reflex in human behavior is the knee jerk. If one sits on a table, with the lower part of the leg suspended, the knee jerk can be produced by firmly but gently striking the tendon just below the kneecap with the edge of a book or with the hand. The usual response is an involuntary kicking movement.



SUPPORTING HIMSELF

This young infant nicely illustrates the tenacity of the grasp reflex of early childhood. Note the position of the thumbs. (By permission, from Paul Popenoe, *The Child's Heredity,* Williams & Wilkins Co., Baltimore, Md.)

Another human reflex is the involuntary winking in response to a touch in the vicinity of the eye. It occurs with normal infants at birth. The wink produced by the visual stimulus of an object approaching the eye may also be a reflex, although it may involve some learning.

Glandular activity is largely reflexive in nature. The salivary glands secrete without previous learning when food and other substances are placed in the mouth of a new-born child. Most of the glands of the body are ready to function in some degree by the time of birth, but their growth continues, and their later behavior may also be influenced by learning.

In each of these reflexes as well as in others it is to be noticed that the activity appears promptly and uniformly when the appropriate stimulus is presented.

Within narrow limits these reflexes may be modified by learning, but they usually persist throughout life with little modification. Very few such responses involve the cortex or gray matter of the brain when they appear in their unlearned form.

Reflexive Activity of Human Infants.—It will be worth while to list a few of the reflexive activities in the human infant at birth. The list on page 74 is confined largely to those reflexes in which both the activity and the stimulus can be observed.

The stimulus is largely internal or organic in nature in such activities as coughing, gasping, yawning, hiccoughing, sneezing, and vocalizing. All of these and many more are illustrative of the behavior called reflexive. They are all relatively simple responses to simple stimuli. Each response normally includes only a small group of mechanisms, such as a related group of muscles or a gland. Some of these groups remain almost constant throughout life, and are changed very little by either maturation or learning. Others are modified in varying degrees, while still others tend to disappear entirely. All involve the central nervous system, but none depend upon the higher complex neural mechanisms of the brain. Many are ready to function without learning, depending upon the innate development of the structure.

Activity	Stimulus
Wink.	Tactual, upon or near the eye itself. Later, approach of an object to the eye, i.e., visual stimulus.
Pupilary or iris reflex.	Change in the intensity of light.
Turning the head.	Light touch on the cheek when child is hungry.
Sucking movements of the lips.	Touching the lips with nipple or other object.
Increase in salivary activity.	Presence of food in the mouth.
Swallowing and gulping.	Presence of a substance in the back of the mouth or at the base of the tongue.
Spitting.	Noxious substance in the mouth.
Eye movements. Fixation.	A light or object at short distance.
Grasping.	Contact of rod-like object across the palm of the hand.
Babinsky reflex. (A fanning-out movement of the toes, quite different from the curling-in movement characteristic of later life.)	Stroking the sole of the foot with a blunt object.
Movement of arms, legs, and head, including withdrawal and defensive movements.	Numerous stimuli, external ones tactual in nature.
Smiling, laughing, and cooing.	Tickling certain areas of the body.

Instincts.—Instincts are like reflexes in that both appear promptly when the structure is sufficiently mature and the organism is appropriately stimulated. Both are essentially uniform for the whole species and are relatively uninfluenced by learning. Both may be absent at birth and may appear later, and both often seem to serve a definite purpose in the individual's life economy. When the responses are localized and only slightly subjected to the effects of learning, they are usually called reflexive. When the responses are complex, involving general adjustment of the whole organism to its surroundings, the term "instinctive behavior" is more appropriate.

The similarity of these responses in all respects except that of degree of complexity and modifiability suggests at once that they

are only different phases of the same process. If all types of reflexive and instinctive behavior were to be arranged along a straight line, the simplest and least modifiable reflex could conveniently be placed at one extreme. The more complex and more modifiable behavior patterns would be placed toward the other end of the line. Hence, only arbitrary distinctions can be drawn between reflexes and instincts or, as will be shown later, between instincts and habits. Some modifiability through learning seems to be possible for even the simplest reflex. On the other hand, the most complex habit has its origin in responses which are innately within the scope of the organism, when stimulated.

Is Instinctive Behavior Purposeful?—Among the several ways in which instinctive behavior has been classified, the purpose of the activity furnishes the most usual basis for classification. Thus, one frequently hears or reads about instinctive food-seeking activity, instinctive self-preservation, and instinctive species-perpetuation. A careful study of some of these activities arouses one's suspicions about the supposed purposefulness of the activity. This suspicion is especially valid if the purpose is thought of as some loosely described inner urge, presumably the result of an inherited memory.

It will be worth while to note some of the studies that have been made of this problem. The behavior of some of the lower animals has been used most frequently for two reasons. First, such animals are freer from social inhibitions than are humans. Hence, their behavior is more easily observed and analyzed. In the second place, it is in these lower animals that instincts are presumably found in a "pure" form, and they supposedly play a more important part in the animal's behavior.

First, observe some of the instinctive behavior of insects. One species of butterfly lays its eggs upon a certain shrub where the larvæ hatch in the fall. They pass the hibernating stage on the shrub not far from the ground. When a certain degree of warmth is supplied in the spring, these larvæ *always move up* the stem and feed on the leaves at the highest tip. One may ask, "Why do they always go up the stem to their food instead of

down the stem to starvation and certain destruction?" These caterpillars have a certain bodily condition which is designated by the term *positive heliotropism*. A tropism is a forced movement. The prefix *helio* refers to the sun or to light in general. Thus, to be positively heliotropic means to have a forced movement toward the light.

When these caterpillars are placed in a horizontal glass tube before a window, they proceed at once *toward the window*. They do not turn back when they reach the closed end of the tube nearest the window. The food which is at the other end of the tube is completely out of reach, for it lies in the direction away from the light. In their normal environment, going toward the light brings them to the first leaves at the tip of the branch. Having eaten of these, the bodily chemical condition is changed, positive heliotropism disappears, and they can then move in any direction.

Another group of interesting and significant facts which apparently has some bearing upon this question has to do with the influence of the endocrine glands. It is well known that a female dog shows maternal solicitude for her young only during a period of a few weeks after they are born. At the end of four to six weeks she will no longer permit them to nurse, nor does she show maternal solicitude.

Gustavson,[1] among others, has isolated, in pure chemical form, one of the female sex hormones. When this hormone is injected into the body of a non-pregnant female dog which has never given birth to pups, she develops the signs of maternal solicitude and the mammary glands secrete as long as this hormone is kept in her body. Gustavson has also shown by his experiments that when this substance is injected into male barnyard fowls they lose their male characteristics of appearance and in some respects behave like the hen.

From this account, it will be clear that while instinctive behavior does serve a useful purpose for the species, it is not a purposeful activity on the part of the individual. Rather, it seems

[1] R. G. Gustavson, *The Journal of Experimental Zoology*, Vol. 64, No. 1, p. 133.

probable that through the ages of natural selection those members of the species which were so constituted organically and physiologically that they responded with these forced movements lived and perpetuated their kind. Members of the species with slightly varying organic constitutions responded to the stimuli of the environment with other types of behavior and consequently died without propagating offspring. No claim is made that these internal organic conditions are the final explanation of the behavior called instinctive, but they do suggest a part of such an explanation.

Other Characteristics of Instinctive Behavior.—Instinctive behavior patterns may be brought into action by a great variety of stimuli. Most frequently it is necessary to take into account whole patterns of stimulation in order to understand the complex characteristics of the instinctive behavior pattern. The stimulation often involves elements that are quite diverse, some depending upon the condition of the organism at the moment, others upon factors of environment. The latter may be either social or non-social, depending upon whether or not they involve other human beings. The condition of the organism may change from moment to moment or from year to year. The conditions of the environment are extremely mobile so that very great changes may be expected among them from time to time. It must be noted, too, that a change in any single element in the total group of stimuli may result in the formation of a significantly different pattern of stimulation and hence of response.

For example, consider the manifestation of human mother love, much of which unquestionably depends upon learned social factors of stimulation. The sight and contact of the child provides an external source of organic stimulation, while at the same time there are intraorganic factors which must also be considered as sources of stimulation, although the mother may not be aware of them at all. One such factor, most frequently recognized during the period of lactation, is the distention or discomfort caused by the increased accumulation of milk in the mammary glands. These and many other sources of stimulation

may simultaneously form parts of the total pattern which may undergo noticeable changes from time to time.

Another significant characteristic of instinctive behavior is the great complexity of the response itself. Instinctive responses normally represent an adjustment of the person as a whole to his environment. Since both the stimulating environment and the human organism are extremely complex, it would be unreasonable to expect to find a simple explanation for the whole response, which could be labeled an "instinct."

Assume that you observe a boy running across a field. Such running behavior might be the result of an instinct of curiosity, of hunger, of fear, or of many other assumed motives of an instinctive kind. It might simply be called running behavior, but usually the psychologist is interested in knowing what makes the boy run. The only way such a question can be answered is to examine the behavior pattern itself in the light of the whole external situation in which it is exhibited. Only through such a procedure is it possible to discover why the boy is running.

In order to understand why the mechanism behaves in the particular manner observed, it is necessary to know more than merely the nature of the stimulus, the nature of the response, and the nature of the organism at the moment of response. Each must be considered in the light of the others. By way of illustration, consider the case of the pendulum-regulated clock, all wound up and ready to go. There it stands motionless until the pendulum is touched in a particular manner, whereupon it starts ticking, the hands move, and it is said to be running. Was it the touching of the pendulum that made it move? Only in a limited sense. After all, it is the adjusted, wound-up condition of the mechanism as related to the touch that makes it respond as a clock is expected to respond. Suppose that the mechanism is out of its usual adjustment so that no tension exists; then the clock will react differently or may not react at all, in spite of being stimulated in exactly the same manner. Or suppose again that it is ready to go, but instead of touching the pendulum the observer sits down in front of the clock and talks to it. No response takes place, of course. The nature of the stimulus, though

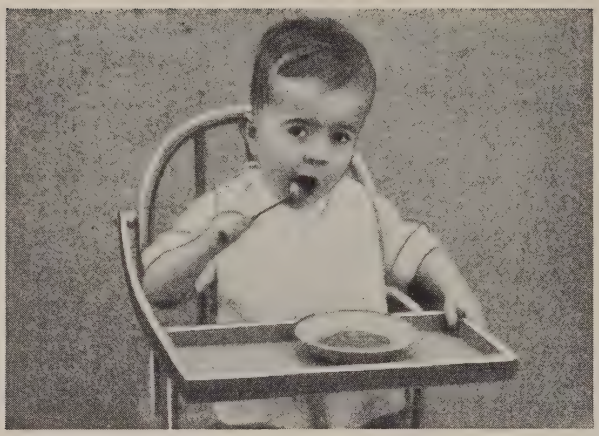
adequate for other mechanisms, is not appropriately related to this one.

Instinctive Behavior Is Not Entirely Uniform or Unlearned. —Universality and uniformity have come to be accepted as significant characteristics of instinctive behavior by most laymen and by some psychologists. Often only a few casual observations are made, and these may tend to overstress the importance of *seeming similarities* and to overlook *important dissimilarities.* A closer examination of such behavior will show that the responses of two individuals of the same species may be far from exactly identical or the similarities of accomplishment may be noted, but the diversity of the behavior itself may be overlooked. When prevented from carrying out the behavior first attempted, the animal can be expected to attempt some modification of the original response. The farther up the scale of animal life one goes, the greater this modifiability seems to be. Man, standing at the top of the scale, is the species showing the greatest degree of modifiability.

No one who knows the habits of birds would mistake the nest built by a robin for that of a Baltimore oriole. But not all robins' nests are made in the same kind of places or even of the same materials. On the other hand, man has a wide variety of sheltering structures, but no one has suggested that the similarity of structure observed among the shelters of primitive tribes is due to any inborn tendency to build that kind of house because it is simply assumed that man's behavior is modifiably adaptable to his environment.

It has not been determined whether or not young orioles raised entirely apart from their species would build nests of the oriole type. However, experiments have been carried out to test the instinctive character of the song of birds. Scott [2] raised young orioles so that they never had opportunity to hear the songs of the adult birds. All of them learned to sing, but they developed a song quite different from birds brought up with the wild

[2] W. E. D. Scott, "Songs in Birds," *Science,* 14:522; "Data on Songs in Birds," *Science,* 15:178; "The Inheritance of Song," 19:154.



APE AND CHILD USING SPOON

Note the difference in the manipulatory skill of the two. (From W. N. and L. A. Kellogg, *The Ape and the Child,* McGraw-Hill Book Co., Inc.)

APE AND CHILD PLAYING

Note the comparative skills in handling the play objects; Donald 18 months, Gua 16½ months. (From W. N. and L. A. Kellogg, *The Ape and the Child,* McGraw-Hill Book Co., Inc.)

orioles. He repeated this experiment with a number of other species of birds, with similar results in every case. Conradie [3] brought up young English sparrows with canaries. He found at first that the vocalization of the sparrows was characteristically that of sparrows, but later they developed a song resembling that of the canaries. Still later, when they were placed with normal sparrows, they soon took up the usual sparrow chirp. Finally, he returned them to the company of the canaries and reports that they adapted themselves to the canary type of song. Such experiments, although involving only a few kinds of behavior and a few species of animals, cast serious doubt upon the unlearned character of so-called "instincts," even where such behavior is quite universal with the species. It is probable that much of the universality of behavior in the human species is also largely due to learning. Such learned activities, although they greatly resemble those called instinctive, might better be thought of as *universal habits.*

A good deal of the similarity of behavior that is observed in human beings must be accounted for in two ways. In the first place, all human beings have certain marked similarities of structure. In the second place, they are stimulated in a common manner, especially during infancy and early childhood. These two factors together easily explain much of the similarity of behavior that is commonly thought of as instinctive.

Kellogg [4] carried out a very unique experiment in an attempt to discover the relationship between inherited structural characteristics and the effects of environment during infancy. Since it is socially impossible to raise a human child in the environment of an ape, he brought an ape into his home for a period of nine months. The ape was seven and one-half months old at the time the experiment began. His own child was ten months old. The ape was treated exactly like a child, never as a pet. During these nine months, the ape and the child played together, were tested together, and, in general, lived like brother and sister. During the experiment, tests were employed to show the nature of the

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[3] E. Conradie, "Songs and Calls," *Journal of Psychology,* 16:190.
[4] W. N. and L. A. Kellogg, *Ape and Child,* New York, McGraw-Hill Book Co., 1933.

responses of the two individuals. In such an environment the ape behaved very much more like a human being than do young apes raised in the usual ape environment. The ape did not become a human being, for structurally the child and the ape were different, and these structural differences were as clearly apparent at the end of the experiment as at its beginning. For example, the ape learned to respond to a very large number of words but never learned to reproduce the words. The boy's behavior was also somewhat different from that of boys of the same age who had been raised exclusively in the company of humans. This experiment, the first of its kind, must be repeated with other individuals, over longer periods of time, before the final answer to the question of the relative influence of nature and nurture can be answered, even in such limited situations.

Are There Any Human Instincts?—If instincts are to be regarded as definite, inborn, unlearned patterns of response, they must necessarily be very few in number for the human species. Human instincts are therefore best thought of as inborn urges to behave according to certain patterns which are determined by the inherited nature of the structure. However, there is no reason for thinking of these patterns as being unmodifiable. Such would be a contradiction of terms and a dynamic impossibility.[5] These patterns of human behavior may be considerably modified through the changes in the organic structure resulting from growth and experience common to the species. Since human beings have an organic structure which is more modifiable than that of any other species, it is not surprising to find that their behavior patterns are much less fixed and less uniform than are those of the lower animal species.

Finally, it must be remembered that instincts do not differ from habits in any very significant manner. The term "habit" is usually used to designate the behavior resulting from a modification of the pattern of one's structure, as it is differentiated by individual differences of experience, so that once the habitual

[5] R. H. Wheeler and F. T. Perkins, *Principles of Mental Development,* New York, T. Y. Crowell Co., 1932, p. 200. See also p. 122.

behavior has been established the individual is literally compelled to respond in terms of his modified organic structure. Any tendency to behave in a particular manner, therefore, tends to be called either a habit or an instinct depending upon whether it is essentially a differentiated response or one that is common to the whole species. The "dynamicness" of behavior and the effect of experience upon behavior will be further discussed in later chapters, as these factors pertain to human motivation and human learning.

An Outline Summary

1. The characteristics of instinctive and reflexive behavior.
   - A. Because members of the same species have similar structures, their instinctive and reflexive behavior patterns will show close similarities. This accounts for the universality of instinctive traits within a species.
   - B. Such behavior is purposeful only in the sense that it serves a useful end for the members of the species in the usual environment. It does not imply an inborn purpose of the individual to behave in a particular manner.
   - C. Instinctive behavior (and reflexive behavior to a lesser degree) may be set into action by a variety of stimuli and may manifest itself in a variety of ways.
2. Instinctive and reflexive behavior is determined by the nature of the structure as it exists at birth or as it is modified by the processes of anatomical and physiological development.
3. The differences between instinctive and reflexive behavior.
   - A. Instincts are more complex patterns of behavior, normally involving adjustment of the body as a whole, whereas reflexes usually involve only adjustments of restricted parts of the body.
   - B. The larger instinctive patterns are usually more modifiable than the ones called reflexes.
4. Limitations of the term instinct when applied to human behavior.
   - A. Instinctive behavior is normally influenced to an important degree by experience, so that after the period of very early infancy has passed all behavior must in part be accounted for in terms of experience. To the extent that

learning plays a determining rôle, the behavior is no longer called instinctive.

B. Human beings are probably more modifiable by experience than any other species. Hence the term instinct has a very limited application in describing human behavior. However, the term does tend to stress the point that habits are dynamic in themselves.

C. An important characteristic of instinctive behavior is its dynamic quality sometimes called an "urge." This quality it shares with behavior patterns called "habit."

Problems for Further Thought

1. If "instinct" is defined as follows, why is it inappropriate to use the term when speaking of human behavior: An instinct is an inborn pattern of behavior appearing uniformly for all members of the species, independently of structure and experience?

2. Explain the only meaning that may be given the word "instinctive" if it is to be used appropriately in describing human behavior.

3. Show by illustration how some bit of human behavior may serve a useful purpose and yet not be purposeful in the sense that the behavior was actually planned.

4. The emphasis in this chapter has been placed upon an explanation of instinctive behavior in terms of both the stimulation and the organic condition prevailing at the time the action takes place. Point out the difficulties entailed in employing this explanation when accounting for any particular instinctive response. Show also how these difficulties compare with those involved in any other kind of explanation of instinctive behavior.

5. Illustrate one of the kinds of human behavior formerly classified as instinctive, such as "self-preservation," and show how important the learned elements really are to the whole response.

6. Show by an illustration involving human behavior how similarities of the inherited nature of structure and similarities in the early environment are sufficient to account for similarities in behavior patterns that have been so strongly stressed in the older notions of instinct.

7. During a recent football season the sports editor of a metropolitan newspaper, in calling attention to the several games to be

played during the next week-end, said, "Every fan will have ample opportunity to exercise his football instinct." This is obviously an entirely different meaning of the word "instinct" from that developed in this chapter. Make a list of other uses of the word "instinct" that will illustrate the truth of the statement that when the word is used by the non-psychologically trained person, it usually is employed as a means of admitting that the cause of the behavior in question is not clearly understood.

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Chapter 5

SOME OTHER WAYS IN WHICH BEHAVIOR DEPENDS UPON STRUCTURE—WHAT ARE EMOTIONS?

Characteristics of an Emotion.—The theory has been insistently advanced in the past that emotions were nothing more than states of consciousness and were composed of sensations originating in various parts of the body. Muscular and glandular responses were either believed to cause, or to result in, emotions. For a time the chief issue was whether such responses came before or after the state of consciousness called an emotion. More recently, however, psychologists have tended to minimize the rôle played by consciousness in emotions, preferring to study objectively the responses of the muscles and glands themselves. This is the point of view taken in the following discussion.

Comparison of emotional and instinctive behavior reveals both similarities and differences. Instinctive responses have been shown, in the preceding chapter, to be those that characteristically involve the adjustment of the person as a whole to his external environment. Emotional responses are those in which the internal adjustments predominate. Emotional and instinctive behavior are alike in that both are, to some extent, innate, and both may be extensively modified by experience. Instinctive behavior involves primarily the muscles attached to the skeleton, while emotional behavior affects mostly the non-skeletal muscles and the glands.

The muscles not attached to the skeleton are called *visceral* or smooth muscles. The largest of these are found in the digestive tract, but they appear also in many other places in the body. Tiny muscles of this sort control the ducts of the glands, such as the perspiration ducts. Others are so arranged in the skin that when they contract, the "hair stands on end," as in fear or anger. Vis-

ceral muscles are slower in their response to stimulation than are skeletal muscles. They can also remain contracted for a longer time without fatigue.

The glands are composed of cells which secrete certain substances. Glands are scattered throughout the body and may be classified conveniently into two groups, those that have ducts and those that are ductless. The glands of digestion and perspiration are duct glands. The ductless or endocrine glands pour their secretion directly into the blood as it circulates through them. The thyroid and the adrenals are examples of this kind of gland.

"Emotions" or Emotional Behavior?—The term "emotion" should not be regarded as a name for a type of response that is entirely different from non-emotional behavior. Behavior is a continuous, complex process involving simultaneous activity in many parts of the body. Man does not respond now with an emotion, then with an instinct, and at some other time with a habit. These names do not designate distinctly different types of behavior; they are merely abstractions which are necessary for convenience of study. The behavior commonly called emotional is an "emotion" in pure form only within a textbook. The same is true of an "instinct" or a "habit." Some of the characteristics of emotional activity are present at all times in everyday life and comprise what is sometimes called one's *emotional tone.* These emotional elements intensify, inhibit, and otherwise modify the behavior in process at any given time and are integral parts of the whole pattern of behavior.

Emotional responses may differ in intensity, but when a particular one is being experienced it literally dominates all the organs of emotional response. One might say a person instinctively withdraws the right arm from the prick of a pin, but one would never speak of being angry in the right arm. This "all-over-ness" is a very important characteristic of emotional behavior.

Emotional responses change readily from one into another. Under unusual circumstances a person may pass rapidly from the heights of elation to the depths of despair and back again,

but ordinarily this change does not touch the extremes. Only one emotional pattern can be experienced at a time. The individual is never angry with one part of his body and happy with another part.

Difficulties in Studying Emotions.—Because of at least two factors, emotional responses are difficult to analyze. Most of the parts of the body involved in an emotional response are hidden from observation. Changes in the activity of the glands can sometimes be inferred from observation, as in the case of increased perspiration. But for the most part, emotional changes can be detected only by chemical examination of the blood or by experiments involving removal or alteration of certain glands. Obviously, this last cannot be done except under controlled conditions, and with lower animals as subjects; and in such cases all possibility of verbal report is of course out of the question. Another difficulty is that an emotional response is normally a complex and widely scattered pattern. Observation of more than a few of the part-responses is impossible, whether the emotional response is studied introspectively or is recorded by mechanical devices.

Introspection as a method of studying emotions is not reliable. Who can tell by examining his consciousness whether his adrenal glands are functioning rapidly or slowly? Moreover, the sort of self-analysis required by introspection calls for an attitude of calmness and a lack of emotional bias which is impossible to maintain when one is influenced by strong emotions.

An objective study of emotions is also difficult. In an attempt to study emotional responses objectively a subject was strapped firmly into a chair, and recording devices for measuring parts of his emotional response were adjusted. He was asked to write in detail an account of his most intimate and embarrassing personal experience, with positive assurance that no one would know what he had written. This insured that the response would be genuine, and the experiment proceeded to its conclusion. While discussing the results, the instructor picked up what the subject had written and began to read the contents aloud. The emo-

tional response was almost instantaneous, but an objective record was not obtained. The subject left the room with his paper, dangling various pieces of apparatus behind him.

Briefly then, emotions may best be described as complex patterns of response which involve predominantly activity of the glands and the visceral muscles. They are diffused responses comprising a total complex whole. *Their function may be said to be that of adjusting the individual internally* to the needs of a particular situation, much as instinctive behavior adjusts the individual to his external environment.

Nervous System Controlling Emotional Responses.—In order to understand how these complex internal adjustments are brought about, it will be necessary to know something of the structure and function of certain parts of the nervous system.

All responses of the skeletal muscles result from nerve impulses distributed *directly* to them from the brain or spinal cord. In the case of the visceral muscles and the glands, there is an *intervening link* between the central nervous system and these organs of response. This intervening link as a whole is called the autonomic nervous system. It is composed of *ganglia,* each made up of many nerve cells. A series of these ganglia lies in two rows, parallel to, but outside of the spinal column. They are connected by chains of nerve fibers. From these ganglia other nerve fibers pass to the various glands and groups of visceral muscles all over the body, so that the whole system may function in an integrated manner.

Other ganglia are scattered throughout the body. Some are very close to the organs they supply, as is the case with those in and near the heart and lungs. These groups of ganglia are sometimes called plexuses, viz., the solar plexus in the upper abdomen near the surface of the body.

Within the autonomic system there is provision for two different kinds of adjustment. First, it is itself divided into two functional divisions which in general operate in an opposing manner. Every visceral muscle and every gland has a connection with both these divisions. This makes it possible for each organ

to be a part of two essentially different patterns at different times. For instance, under emotionally satisfying conditions digestion is accelerated, while during anger it is inhibited.

A second type of adjustment involves the grouping together of the responses of all of the organs involved in emotion into two essentially different patterns. These will be called "emergency" emotions and "appetitive" emotions. The names are only roughly descriptive, but they will serve to call attention to the chief characteristics of each.

The "emergency" emotions are so called because they serve to prepare the body to meet primitive emergencies, as in rage, fear, and strong excitement. During this type of emotional response the glands and muscles of the digestive tract are inhibited, while the heart and adrenal glands are speeded up. The appearance of adrenalin in the blood causes more blood sugar to be released from the liver. The walls of the arteries in the abdominal region are constricted, forcing more blood into the skeletal muscles. Metabolism is heightened; the rate of respiration is increased; the amount of perspiration increases noticeably. In short, a whole pattern of responses is "thrown into gear" preparing the body for an emergency, hence the name "emergency" as supplied by Cannon.[1]

On the other hand, when the other functional division of the autonomic nervous system is dominant, the digestive activities are heightened, respiration is decreased, the heart beat is lessened, and the blood pressure drops. Adrenal activity is decreased, and in general there is a state of well-being that is here designated by the general name of "appetitive emotions."

From the functioning of this autonomic nervous system there results an integration of behavior of the widely scattered and otherwise independent vital organs of the body that would be impossible by any other means.

The conservative view of the autonomic is that it is a system of motor relays from the cerebrospinal axis to the visceral organs, chang-

[1] W. B. Cannon, *Bodily Changes in Fear, Hunger, Pain, and Rage*, New York, D. Appleton-Century Co., 1929.

ing the character of the innervations supplied to these organs. Reactions in the viscera differ in character from the reactions of striped muscles. Possessed of some capacity for independent action, these organs—that is to say the muscular and glandular tissue found in them—may be thought of as controlled by the nervous system only in the sense of having their *tonus* steadily *maintained* and also, on occasion, by increase or decrease. The neural impulses in autonomic innervation (arising originally at receptors, of course) pass through the autonomic relays. The smell of food in this way comes to excite secretions in the stomach. The sight of a wild beast or a coiling snake arouses a whole concurrence of a changed activity in the heart, in the blood distribution, in the gastro-intestinal movements of digestion, in the breathing, the perspiration, the mouth (dry) and changes of other sorts—making in all an emotional response.[2]

To Understand Emotions the Total Bodily Response Must Be Considered.—All the activity of daily life is emotionally toned in one way or another. The emergency type of emotional response is more often noted and better remembered than the appetitive. This is because emergency responses are more unusual and more intense. However, the fact that one is not aware of an emotional response does not indicate that there is none.

It should be noted that there are many different names for emotional responses which are very much alike when considered from the point of view of nervous control. Thus, fear and anger are practically alike as far as the internal elements of response are concerned. The response is called fear when it causes the individual to withdraw from the stimulus. It is called anger when it prompts the individual to take a defensive or aggressive attitude. These responses are given different names only because in each case different impulses stimulate the skeletal muscles to activity. In other words, the total emotional pattern to which a name is usually assigned in everyday life involves more than just the internal adjustment of the individual. It includes not only responses brought about directly by the central nervous sys-

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[2] J. F. Dashiell, *Fundamentals of Objective Psychology*, Boston, Houghton-Mifflin Co., 1929, pp. 147–148.

tem, but also those brought about indirectly by means of the autonomic nervous system.

Whether the soldier on the battlefield is a hero or a coward will often depend upon whether he gets started forward or to the rear. Many a panic has been brought about by some little incident in the total situation which initiated a precipitate flight. The heroes on such occasions are likely to be those who have got started with a behavior pattern of an opposite sort.

Genetic Approach to the Emotions.—The approach to the study of emotions as outlined above represents the attitude of the physiologist or of the physiological psychologist. Thus far it has yielded some valuable and interesting data. Another point of attack is that employed by the genetic psychologist.

It would be interesting to follow an adult through the experiences of a day or a week. During this time there would be manifested a number of instances of behavior which would be recognized as due to emotional responses. Yet from simple observation alone, it would often be impossible to be sure what name to give these responses; and if the person himself were asked to report, he would not be of much assistance. The reason for this is, partly, the fact that there are no standards of behavior to which any of the names of emotional responses can be attached. Two different persons may be enraged. This implies that their behavior has something in common, but it certainly does not mean that their behavior will be identical.

By the time a person has reached adult life, he has had many experiences which have not been shared exactly with anyone else. For example, the fear response may be produced in one individual at the sight of a snake coiled up in a path. Another shows no fear response at all to this particular stimulus. If he recognizes it as a harmless sake, he may even catch it and put it in his pocket. On the other hand, both may show responses which they themselves would call fear, but which to an observer may not seem at all alike. Long before one becomes an adult, his emotional responses have become too mixed with each other and too heavily overlaid with learning to permit of exact analysis

by verbal report. It is impossible to tell what the original response might have been. Consequently, it will be worth while to follow the genetic psychologist in his attempts to understand the behavior of adults by tracing the development of this behavior from infancy to adult life.

Emotional Responses of the Infant Which Are Independent of Learning.—In seeking to solve his problems, the genetic psychologist is anxious to know, first of all, what is the original emotional behavior of the infant. This is necessary in order to recognize the significance of the changes that may take place later. To discover the facts about infant emotional behavior, the genetic psychologist must study the infant's behavior in a wide variety of situations.

Watson was among the first to conduct laboratory experiments with the emotional responses of young infants. His subjects were children up to one year of age, many of whom had been observed from birth so that their emotional experience was well known. In order to discover which fear responses were unlearned, these young children were presented one after another with such stimuli as animals, birds, darkness, and fire. A passage from one of Watson's lectures will illustrate his methods.

> We first took the children to the laboratory and put them through the routine of tests with various animals. We had the laboratory so arranged that they could be tested in the open room, alone; with an attendant; with the mother. They were tested in the dark room, the walls of which were painted black. This room was bare of furniture. It offered an unusual situation in itself. In the dark room we had conditions so arranged that we could turn on a light behind the infant's head or illuminate the room with the light in front of and above the infant. The infants were always tested one at a time. The following group of situations was usually presented:
>
> First, a lively black cat, invariably affectionately aggressive, was shown. The cat never ceased its purring. It climbed over and walked around the infant many times during the course of each test, rubbing its body against the infant in the usual feline way. So many false notions have grown up around the response of infants to furry animals that we were surprised ourselves to see these youngsters *positive always* in

their behavior to this proverbial "black cat." Reaching out to touch the cat's fur, eyes, and nose was the invariable response.

A rabbit was always presented. This, likewise, in every case called out manipulatory responses and nothing else. Catching the ears of the animal in one hand and attempting to put it in its mouth was one of the favorite responses.

Another furry animal invariably used was the white rat. This, possibly on account of its size and whiteness, rarely called out continued fixation of the eyes of the infant. When, however, the animal was fixated, reaching occurred.

Airedale dogs, large and small, were also presented. The dogs were also very friendly. The dogs rarely called out the amount of manipulatory response that an animal the size of the cat and rabbit called out. Not even when the children were tested with these animals in the dark room, either in full illumination or with a dim light behind their heads, was any fear response evoked.

These tests on children not emotionally conditioned proved to us conclusively that the classical illustrations of hereditary responses to furry objects and animals are just old wives' tales.[3]

According to Watson, the kinds of emotional responses of early infancy and childhood are limited to three. These he calls fear, rage, and love, but he particularly suggests caution in the use of these terms in their customary sense. The outwardly observable elements of what he calls the fear response are

> . . . a jump, a start, a respiratory pause followed by more rapid breathing with marked vasomotor changes, puckering of the lips. Then occur, depending upon the age of the infant, falling down, crawling, walking, or running away.[4]

Of the rage response he says,

> The unlearned behavior elements in rage behavior have never been completely catalogued. Some of the elements, however, are easily observed, such as the stiffening of the whole body, the free slashing movements of the hands, arms, and legs, and the holding of the breath. There is no crying at first, then the mouth is opened to the fullest extent and the breath is held until the face becomes blue.[5]

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[3] J. B. Watson, *Psychologies of 1925,* Worcester, Mass., Clark University Press, 1927, pp. 42–44.

[4] *Ibid.,* p. 46.

[5] *Ibid.,* p. 48.

The *love* response

> . . . in an infant depends upon its state; when crying, the crying will cease and a smile begin. Gurgling and cooing will appear. Violent movements of the arms and trunk with pronounced laughter occur in even six to eight-months-old infants when tickled. It is thus seen that we use love in a much broader sense than it is popularly used. The responses we intend to mark off here are those popularly called "affectionate," "good-natured," "kindly," etc. The term "love" embraces all of these as well as the responses we see in adults between the sexes. They all have a common origin.[6]

Watson has pointed out three kinds of innate emotional responses. A preceding section suggested only two kinds of emotions, the emergency and the appetitive. An examination of what Watson calls fear and that which he calls rage will show that they are both of the emergency type. In other words, there seems to be no contradiction here of general principles.

Stimuli Which Produce Unlearned Emotional Responses in Infants.—Each of the types of emotional responses mentioned by Watson can be produced in the infant by only a limited variety of stimuli. Those producing fear responses are of two kinds. One is the sudden loss of support which results from dropping the infant or suddenly jerking the blanket upon which it is lying. The other is a sudden sharp sound such as may be obtained by striking a steel bar with a hammer. Not all infants respond in the same manner to these stimuli. Several experimenters have reported finding young children who did not show the usual fear response when thus stimulated.

Rage is essentially the response to restriction of activity. Hampering of movements by clothing, or holding the head or hands will usually produce this response in young infants. The author has succeeded on several different occasions in producing a response similar to that described by Watson as rage, in infants less than one week old. This was done by gently holding the feet and legs in an outstretched position while restricting the move-

[6] *Ibid.*, p. 49.

ment of the arms, head, and trunk. Distinct rage responses have thus been called out in as little as thirty seconds. Throughout life, forms of physical restriction seem to have the power to produce some sort of rage response.

The love response in an infant can be obtained by stroking the skin or by tickling. This is especially effective in the regions upon or around the lips and nipples, and in the region of the external genitals. The same stimulus is effective to a lesser degree in the armpits, over the ribs, and around the mouth or chin. These responses are probably very early associated with objects and individuals in the infant's experience. Fondling by the mother, such as is normally involved in nursing, might reasonably be expected to result in the mother's being able to call forth the love response more readily than others. Possibly the feeding response itself may be, from early infancy, closely associated with the love response. In the appetitive emotional states it must be remembered that the digestive processes are going on at an optimum rate. This fact may have a direct bearing upon the process of taking food into the body and may be responsible for the normal adult's emotional response to food taking.

The external or visible parts of emotional responses and the stimuli by means of which they are obtained from infants are probably, at this stage, largely innate. Marquis, in experimenting with infants one month old, demonstrated that an emotional response to a sudden loud sound was present and could be modified by the process known as conditioning.[7] It is a long way from these simple responses and these limited stimuli to the complex, emotional behavior observable in the average adult. Two factors largely account for the changes that take place. One is the process of growth, while the other concerns the problem of learning. As the child grows to adulthood, these factors become more complex and consequently more difficult to follow and measure.

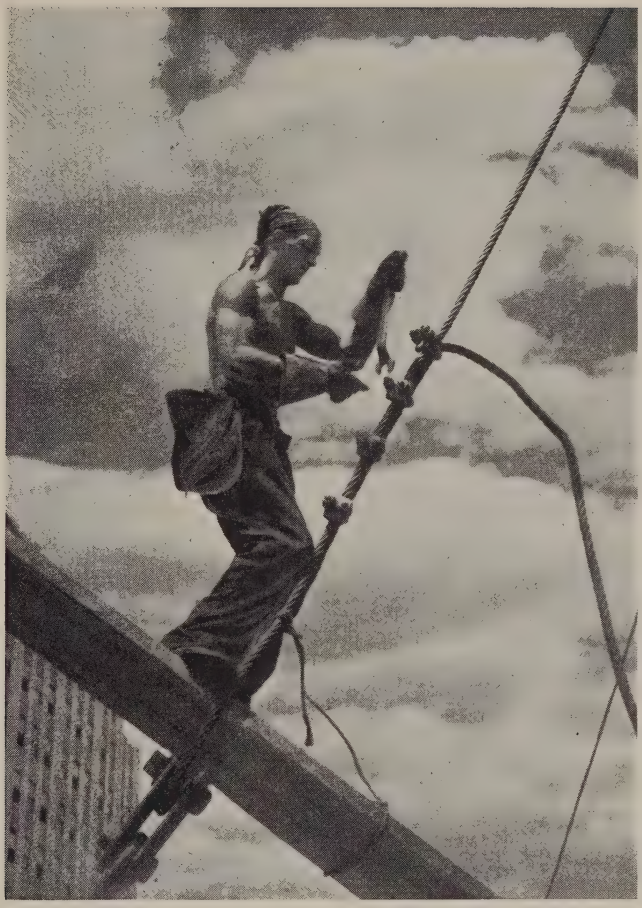
Emotional Responses of the Adult.—When the emotional behavior of the adult is compared with that of the infant, some

[7] Dorothy P. Marquis, "Can Conditioned Responses Be Established in the Newborn Infant?" *Journal of Genetic Psychology,* December, 1931, p. 479 ff.

very significant differences can be noted. These differences concern both the nature of the emotional response and the type of stimulating situation which calls it forth. The adult fear behavior, for example, seldom includes weeping. Probably the most significant characteristic of the fear response of the adult is a temporary loss of control of the usual motor responses of intelligent behavior. When adults are badly frightened, they frequently do most unintelligent things. The oft-observed behavior of the person who is frightened upon discovering that his home is on fire is a case in point. Under such circumstances intelligent adults have been known to throw dishes and mirrors out of the window and then carry an armful of pillows out of doors.

The agitation of fear is often accompanied by a marked decrease in the salivary response. Such a person is sometimes spoken of as being dry-mouthed with fright. This lack of salivary response in fright is the basis of the ordeal of rice, a means sometimes still employed in certain oriental countries for determining whether or not a suspect is guilty of a particular crime. The ordeal consists of giving the suspected person a mouthful of dry rice to chew and swallow. For one who is not frightened this is not a difficult task at all. But the guilty person, fearing that he will be detected, is unable to swallow the dry rice because of a lack of a normal salivary secretion. Similar discomfort is frequently felt by an inexperienced speaker when he finds himself facing an audience. His mouth is dry, and he may frequently attempt to moisten his lips, which will be difficult unless he is supplied with the conventional glass of water.

The stimulating situation that calls forth a fear response in adults is often very different from that to which the infant reacts. Although the infant's customary response to sudden loss of support is also fairly common in the adult, many adults, as a result of their life experiences, have become negatively adapted to these loss-of-support situations and show no fear response to them. Steel workers, engaged in erecting the framework of modern skyscrapers, have become so accustomed to their precarious positions that no fear is apparent in their behavior. On the other hand, adults show fear responses to many kinds of situations that



PERFECT COMPOSURE HIGH IN THE AIR

This picture was made during the construction of Rockefeller Center, New York. Would you feel equally secure and at ease in this worker's place? Explain the reason for any difference. (An Ewing Galloway Picture.)

are not frightening to infants and young children. A four-year-old girl may be prevailed upon to pick angleworms in the garden, yet most girls by the time they are fourteen are very much more inclined to fear them. The fear response to sudden sharp sounds tends to persist in some degree for most individuals throughout life. Here again, however, negative adaptation resulting from many experiences of this sort may completely eliminate such fear responses.

Several years ago the author observed a party of amateur mountaineers crossing a river. It was much too deep and swift for wading, but a good suspension bridge was found. It was stoutly made and hung from two strong steel cables. The foot path was two planks wide. The sides were tightly enclosed with a fine mesh wire to about shoulder height. It would have been difficult to climb off that bridge, to say nothing of falling off. On the side of the river from which the party approached, the bridge extended back from the river bank for nearly fifty feet. Here the branches of the trees had grown close to the mesh screen. They really offered no support, but they gave a substantial appearance to the sides of the bridge. The members of the party did not hesitate to walk along the bridge to the edge of the trees. But at that point trouble began. Most of the women and some of the men showed very evident distress at having to cross the two hundred feet of open bridge. It did very little good to call attention to the fact that the bridge was exactly the same ahead of them as behind them.

Emotional Responses Become Attached to New Stimuli.—Most objects and situations eliciting adult fears have acquired their significance largely as the result of learning. Watson and Jones showed conclusively that infants who did not originally show fear to a particular stimulus—a white rat, for example—could be made to show fear to that stimulus if it were presented on several occasions when the child was frightened by some other stimulus.

In the laboratory this emotional conditioning is accomplished somewhat as follows: First the child is tested with the white

rat to see if any evidences of fear are present. If the child has never been frightened in the presence of a similar object, it is safe to predict that no fear response will be evidenced. Then, while the child is playing with the rat, the experimenter without any warning strikes an iron bar with a hammer. Almost invariably the infant responds to this stimulus with the behavior which Watson has designated by the name of fear. After two or three repetitions of this procedure, the child shows a definite change in his reaction to the white rat. Instead of approaching, reaching for, and playing with the rat, the child now cringes, withdraws, and avoids it. He may even turn and creep or scamper away as quickly as possible. Very often shrieking or crying accompanies this retreat even when the bar is no longer being struck.

When the author's son was about one year old, he was presented one morning with a toy balloon while he was in his mother's arms. He reached for it with both hands, but just as he was about to touch it, the author allowed his fingers to rub the surface of the tightly inflated rubber, causing a sharp sound. This was the boy's first experience with the balloon situation. His response changed instantly from the approaching and reaching one to that of retreat and withdrawal. He could not be induced to have anything to do with the balloon, even though it was in his playroom for several days. He would not even go near it to get a familiar toy. The single simultaneous presentation of the two stimuli gave the sight of the balloon the same power to provoke an avoidance response as the sound had at first called out. Probably most emotional responses are acquired or modified in some such fashion as this, beginning very early in life and multiplying as the individual grows older.

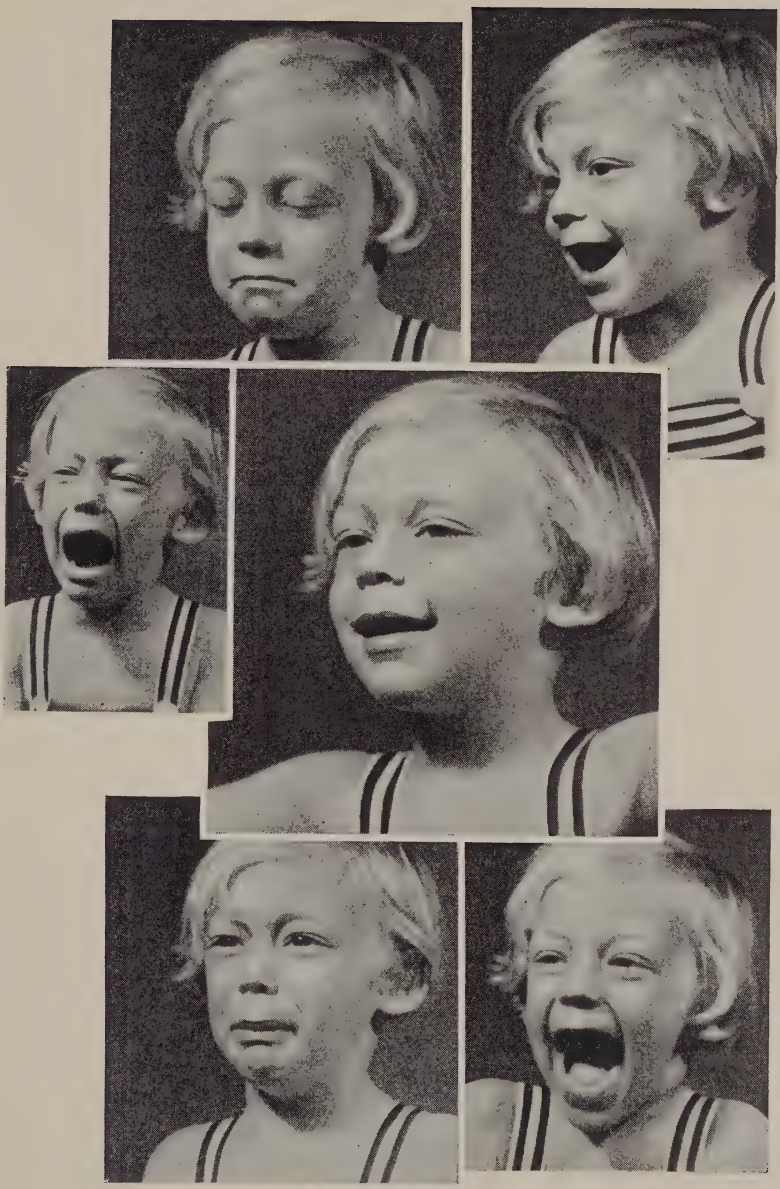
The brackish taste of green olives is to an infant apparently a natural stimulus for avoidance. Many adults will recall having to "learn to like" green olives. Why is it so frequently true that adults do like them? Probably it is largely because most frequently one's first experiences with green olives occur under very pleasant surroundings when one is enjoying a party or a picnic. In the same way, other substances that are very unpleasant

to most persons may be made a rare treat to others. Cod liver oil is a good example. It is usually given to a child who is unwell and out of sorts by an adult who already has a more or less profound disgust for it, and who shows this emotional response by word or gesture. Sometimes it is even given as a punishment. Is it any wonder that it becomes the stimulus that will call out undesired responses? If it is given only when the child is happy, without evidence of disgust from the one giving it and as a reward instead of a punishment, a very different type of emotional response can be established. It is much easier and more fortunate if the desirable response can be established without having first to break down the undesirable one.

One morning some years ago the author appeared at the kitchen door of a neighbor's house. Sitting on a chair in the middle of the kitchen was the father of the family, holding his three-year-old son in his lap. The boy's legs were firmly held between the father's. One of the father's arms encircled the boy's body and held his hands firmly. The other was used to restrict the movements of the child still further, when necessary. Nearby stood the mother, holding a large spoonful of cod liver oil in one hand, and trying to get the boy's mouth open with the other. Even under these heroic circumstances, more oil was sprayed on the wall than the boy was induced to swallow. Is it any wonder that the boy showed a strong dislike for cod liver oil from that time on?

In the family of another neighbor a five-year-old boy was given his cod liver oil only under the most enjoyable and favorable of circumstances. Great care was exercised to avoid anything that might produce an undesirable emotional response. The young lad thus developed a positive fondness for cod liver oil and even succeeded, when the parents were out for the evening, in coaxing an extra spoonful from the girl who was caring for him.

Most adult rage responses probably grow out of being hampered in some manner. At first, the rage response comes only from a hampering of physical movements, but as the individual matures so-called "mental" and "social" hampering frequently produces the same results.



EMOTIONS

What names would you give the emotions expressed here.
See footnote on page 104.

Two small boys, about equally matched for physical strength, were wrestling and scuffling, all in good fun. Finally, one of them got the other one down and sat upon him, preventing his getting up and still further hampering his movements. The good-natured play activity of the boy who was underneath quickly gave way to rage and a genuine fight began, each one, of course, fully believing that the other fellow started it.

At the adult level, restriction of a social sort frequently produces the same result. A man may show no desire to see a moving picture show until the censor closes it, and then becomes rather loud in his insistence that he has a right to see whatever show he wishes. He may get angry and drive to a nearby city to see it, remarking that "no censor can tell me what show to see."

Names of Emotions Are Not Very Accurate.—In order to name an emotion it is not enough merely to be able to observe the responses. The nature of the stimulation must also be known. A group of observers were shown motion pictures of children and adults manifesting various kinds of emotional behavior. As each appeared, the observers were asked to record an appropriate name for the response. When no information was given about the nature of the stimulus, there was very little agreement among the judges. If the pictures were accompanied by a description which told the observer what the stimulus had been, there was considerable agreement in the names assigned to the various emotional patterns.[8] In the same series of experiments, the same general results were obtained when the sound of infants crying was heard by the observers without their knowing the nature of the stimulus that had caused it. It is thus evident that the adult names for emotions are largely the names for responses to certain kinds of situations, more than for certain kinds of responses in themselves.[9]

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[8] Mandel Sherman, "Differentiation of Emotional Responses in Infants," *Journal of Comparative Psychology,* 1927, Vol. VIII, pp. 265–284.

[9] (Picture of emotions shown on page 103.) Statement of the photographer who was the father of this boy: "The boy knew that I wanted to photograph him but while playing with his mother he was so fascinated that he completely forgot the camera. His mother played with him, telling him that he was a bad boy and that she would take away his ball. His expression changed very fast until he cried. Then she calmed him explaining that it was only in fun and he was soon happy again. The whole thing lasted only a couple of minutes."

How Emotional Responses Become Detached from Old Stimuli.—How does one go about detaching an emotional response from a stimulus which is capable of producing it? Persons frequently deplore the fact that they are frightened or enraged by some situation and express a wish that it were possible for them not to be emotional in those situations. Is it possible to control the process of conditioning so that undesirable emotional patterns may be detached from these situations? Is it possible to go farther and substitute another emotional response in place of the undesirable one?

Jones, following Watson's technique of emotional conditioning, gives an account of such a change in emotional behavior.[10] Many others have substantiated her results. At the beginning of this experiment it was proved that Peter had no fear of a rabbit. By the procedure described above he was made to fear the rabbit. Several plans had previously been suggested for eliminating fear, such as allowing the child to forget his fear, practicing the fear response to "wear it out," and removing the fear by inducing the child to talk freely about the fear-provoking stimulus.

All these methods have serious shortcomings. In the case of the first suggestion, it is sometimes impossible to keep the individual out of the fear-provoking situation for the weeks or even years necessary for complete forgetting. Aside from its inconvenience, this procedure involves too large an element of time, since fear responses have been shown to establish themselves rather thoroughly and become long-lasting after only a few repetitions. The trouble with the second suggestion is that it does not work. If the child is actually frightened repeatedly by the same stimulus, the fear response is at least as likely to become worse as to become better. The third procedure has the disadvantage that the child may be trained to talk freely about the rabbit, but will still show a fear response when actually confronted with the rabbit.

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[10] Mary Cover Jones, "The Case of Peter," *Journal of Genetic Psychology*, 1924, Vol. 31, pp. 308–315.

Jones attempted to develop experimentally a more satisfactory technique for the elimination of fear responses. The procedure was somewhat as follows: Each day at the time of the mid-morning lunch, the child was seated in his high-chair far from the door of the nursery. The first day the rabbit was brought into the room in a cage and set down on the far side of the room. This was done while the child was happily engaged with the meal. The child stopped eating and fixed his attention on the rabbit, but otherwise gave no response indicative of fear. Note here that the rabbit was kept far enough away so as not to be a disturbing stimulus for the child.

The second day, the rabbit was again brought in, under similar conditions, but this time it was placed just a trifle nearer the child. This continued for several days, and great care was taken to avoid calling out a fear response to the rabbit. On the other hand, emphasis was placed upon the importance of having the child *respond with a more desirable emotion at the time when he was being stimulated by the sight of the rabbit.* In the course of time, as this process continued, the rabbit could be placed upon the tray of the high-chair with the child happily dividing his attention between his lunch and the rabbit.

In this experiment, two or three points are of particular significance. First, the fear-provoking stimulus is presented simultaneously with another calling forth a desirable emotion. Second, the strength of the stimulus producing the fear must be kept low enough to prevent a response to it, while the stimulus for the desired emotion must be at its maximum possible strength. Third, with successive repetitions of these simultaneously presented stimuli, the fear-provoking stimulus must be gradually increased in intensity. In doing this, however, care must be exercised to prevent this stimulus from becoming strong enough to call forth the fear response. This procedure is essentially the one followed in the case of the boy who learned to like cod liver oil. Probably all one's changes of emotional response to any particular life situation can be accounted for in exactly this way, through employing the principles of emotional conditioning and unconditioning.

In carrying out such an experiment with emotions, note that, first of all, the individual must be *desensitized* emotionally to the particular stimulus which elicits the emotional response. This "getting used to" a stimulus has very appropriately been called "unconditioning." Very frequently it will be desirable, as in the case of Peter, to carry the conditioning farther, so that an actual substitution may be achieved of the desired emotional response for the undesired one. This has been called "reconditioning."

By means of such techniques it is possibly to modify emotional behavior with a considerable degree of assurance of success. The only difficulty that will be encountered by those who understand the technique adequately will be that of controlling the intensity of the stimuli for each response.

Relationship Between Internal and External Components of an Emotional Response.—A question of some interest concerns the relationship between internal and external elements of a total emotional response. What is the relationship between those parts of the response that are controlled directly through the central nervous system and those that are autonomically controlled? Actors and others are probably very adept at producing indications of profound emotional responses without experiencing more than the outward elements of the emotions involved; on the other hand, some persons become very adept at concealing emotion by limiting its observable elements.

There seem to be at least two distinct ways in which the outwardly visible signs of emotional response are of importance. In the first place, they have a marked influence upon the behavior of others. Many a man has fully made up his mind to ask his boss for a raise or a vacation only to have his behavior totally changed by the frown on the boss' face when he approached to ask the question. In the second place, these outward evidences of emotion seem to exert an influence upon the profoundness of the emotion as it is experienced inwardly or consciously. Because these external manifestations normally accompany the internal elements of the total response, any stimulus that will call out the former tends to involve the latter as well. The internal

responses are aroused chiefly through the autonomic nervous system and, hence, are involuntary. The external responses, controlled through the central nervous system, are more or less subject to voluntary control. Therefore, this relationship between the external and internal elements of the total response provides a satisfactory means of modifying its intensity.

If the reader has ever read Robert Burns' "Tam-O-Shanter," he may recall the picture the author paints of Tam's wife waiting for his homecoming and "nursing her wrath to keep it warm." What was she probably doing to keep her emotion going? What does one do when one wishes to keep one's anger alive and glowing? Probably Tam's wife banged the pots and pans. She stirred the fire with more than necessary vigor. The door was slammed in no uncertain fashion and, through all the late evening, she could be seen walking around the house with a firm step and with a stern expression on her face. She nursed her wrath by emphasizing the voluntary behavior that usually accompanied it.

Possibly the necessity for maintaining one's anger is infrequent, but at the other extreme many have literally "whistled to keep their courage up," and have assumed the outward appearance of bravery in order to keep from being afraid. When one is "feeling blue," one sometimes makes a deliberate attempt to adopt an attitude of cheerfulness. At first this is forced but gradually it becomes more genuine, due to the fact that in previous experience the outer and inner elements of a total response have accompanied each other. The significant point about all of this is that, since there is no direct voluntary control over some of these emotional responses, *an indirect control over them can best be attained by means of those elements over which control is in some degree possible.*

Emotions and the Endocrine Glands.—The foregoing is not a complete statement of emotional behavior. Not very much has been said of the rôle of the glands, particularly of the endocrine glands, which are believed to play a very significant part in these responses. The word "probably" is used because as yet so little is known with certainty about their influence upon emotional

behavior. Hence, it must be sufficient to note that those long-time emotional tendencies, commonly called traits of temperament, are the ones most profoundly influenced by the endocrine glands. They deserve a more thorough consideration than can be included here.

An Outline Summary

1. The nature of an emotional response.
   - A. Emotional responses tend to be concerned primarily with the problem of internal adjustment. They involve:
     - (a) The smooth muscles (non-skeletal),
     - (b) The duct and ductless glands, and
     - (c) The autonomic nervous system.
   - B. Emotional responses tend to be diffuse, all-pervasive responses because:
     - (a) The muscles and glands chiefly involved are widely distributed throughout the body, and
     - (b) Whole groups of these organs are thrown into action simultaneously through the autonomic nervous system.
2. The genetic approach to the study of the emotions.
   - A. Such an approach is important in order to discover:
     - (a) The original nature of such behavior before it is complicated by maturation and experience, and
     - (b) How experience modifies emotional behavior.
   - B. The infant's original, unlearned emotional responses are:
     - (a) Few in number,
     - (b) Aroused by only a few kinds of stimuli, and
     - (c) Easily modified by experience.
   - C. Adults' emotional responses are:
     - (a) Very divergent in specific details for different persons, and
     - (b) Closely related to each individual's experience.
3. Emotional control.
   - A. Control of emotional responses involves two types of factors.
     - (a) Emotional responses may be established and removed by conditioning and reconditioning as described by Watson and Jones.

(b) The close association of the autonomically controlled elements and those controlled through the central nervous system makes it possible to increase or diminish the former by voluntary control of the latter.

Problems for Further Thought

1. Mary is not invited to a party given by her chum with whom she has recently had a quarrel and she is very miserable about it. A sympathetic teacher learns of the matter and suggests that the best thing she can do is to have a good cry and thus "get it out of her system." What two good reasons can you suggest why the teacher was mistaken?

2. John is in the fourth grade and has developed a pronounced dislike for arithmetic. This is so very bad that it threatens to cause his failure to "make his grade" this year in school, although the boy has at least the average mental development of his grade. Assume that you are his teacher and that you are going to employ Jones' reconditioning procedure. Explain rather specifically how you would go about this process. In doing so, be sure to keep in mind the several steps suggested by the case of Peter.

3. Ralph is eighteen months of age. He has never been afraid to go to sleep in a dark room. One night a sudden strong wind caused the window shade of his room to make a noisy rattling sound until he was wakened by it. From then on, he showed a great emotional protest against being left in his crib in the dark. How do you account for this emotional response which contrasts so sharply with his previous behavior?

4. As in Problem 2 show how you would go about reconditioning Ralph's behavior mentioned in the preceding problem.

5. Would it be possible for professional actors of such great tragic rôles as Othello, Shylock, or Lady Macbeth *really,* inwardly to experience the tragic feelings as they are apparent from the outwardly visible evidences of such emotions and, at the same time, continue in good health week after week and year after year? Why or why not?

6. In what respects is the situation in the preceding problem different from that of the amateur actor who has to "live his rôle" in order to portray it vividly on the stage?

7. In light of the two preceding problems, state the general principle by means of which the average non-actor might reasonably control the inner experiences of an emotional response, so as to make this feeling either more or less vivid as the occasion demanded.

8. Give several illustrations from your own experience of the way in which your behavior has been modified by the "expression of an emotion" of someone to whom you were reacting. These need not be striking or unusual events, but rather the usual, everyday sort of incidents of life.

9. Assume that you, as an adult, are responsible for the emotional training of a child. What procedure would you suggest as a means of developing a feeling of confidence in, and even enjoyment of visits to, the doctor's or dentist's office or to a barber shop? When should such training begin?

10. A teacher returning to a room after a short absence finds an annoying prank has been played. She punishes the culprit by making him remain after school and learning many lines of poetry. From the points of view of this chapter, why was this procedure psychologically unfortunate?

Suggested Readings

Dashiell, J. F. Fundamentals of Objective Psychology. Boston, Houghton-Mifflin Co., 1928. In Ch. VII, "Native Reaction Patterns—Special Studies of Emotional Patterns in the Adult," pp. 205–228. A systematic treatment of the problems of emotion.

Morgan, J. J. B. Child Psychology. New York, Richard R. Smith, 1931. Ch. V, "Emotional Development," pp. 127–157. This reading deals with emotions from the point of view of their development during childhood.

Oliver, J. R. Fear, The Autobiography of James Edward. New York, The Macmillan Co., 1931. This is a full length story of the encroaching fear, the succeeding nervous breakdown in the life of one man, and one way in which a disorder might be treated.

Watson, Goodwin B., and Spence, R. B. Sketches In and Out of School. New York, 1927. Ch. XI, "Problems of Emotional Conditioning," pp. 143–177. This contains excellent problem materials for further study of the application of the principles brought out in this chapter. It also contains an interesting bibliography for further reading.

Watson, J. B. Behaviorism. Rev. ed., New York, W. W. Norton & Co., 1930. Chs. VII and VIII, pp. 104–195. This reading contains a full but informal account of Watson's experimental genetic studies of emotions.

Wiggam, A. E. Exploring Your Mind with the Psychologists. New York, Bobbs-Merrill Co., 1928. Chs. VII to IX inclusive, "What Are You Afraid of?" Contains interesting and valuable suggestion of Dr. David Mitchell concerning the problems of fears of adult life.

Chapter 6

WHAT ARE THE MAINSPRINGS OF BEHAVIOR?

The importance of the dynamic quality of both instincts and emotions has been stressed repeatedly. The problem of motivation cannot be divorced from these and other aspects of human behavior, but it deserves special consideration in order to understand the more complex aspects of behavior.

The most obvious answer to the questions forming the title of this chapter is that man behaves like a human being because he has the structure of a human being. It will therefore be appropriate to describe the most pertinent characteristics of this structure, emphasizing in general the manner in which it works. The more specialized problem of motivation will then be considered in some detail.

Why and How Does Man Respond to His Environment?—For purposes of convenience in explaining the how and why of his responses, most of man's organs may be divided into three groups. First, there are the *receptors,* or sense organs. A second group are the *effectors,* or response mechanisms, which include all of the muscles and all of the glands. The organs of the third group are often called *connectors.* They include all of the nervous system by means of which the stimuli acting upon the sense organs bring about responses in the muscles and the glands. In a limited sense, the blood stream may also be called a connector, since it carries the secretions of the ductless glands.

1. Receptors. By means of the sense organs man is in touch with the world of which he is a part. Various kinds of energies from the natural world about him are brought to bear upon his structure, each through a different kind of sense organ. There are some kinds of natural forces to which man cannot respond directly because he does not possess organs that are sensitive

to such energies as radioactivity, X-rays, and cosmic rays. However, there are sense organs that respond to most known kinds of physical energy. There are at least four kinds of sense organs in the skin alone: pain spots, touch spots, cold spots, and warm spots. There are probably thousands of each kind. Each organ is complete in itself and is connected with the brain or spinal cord by a sensory nerve fiber. Each is highly specialized in the kind of stimulus to which it normally responds.

Experiences of warmth and cold are obtained only as the corresponding sense organs are appropriately stimulated. Beneath the skin, in the muscles and the lining of the joints, even in the tendons, there are thousands of other sense organs which are called pressure capsules. In the retina of the eye there are the specialized sense organs, called rods and cones, upon which vision depends. In the inner ear are the sense organs by means of which hearing is possible. Close to the inner ear are others that are important in maintaining balance. Other kinds of specialized sense organs are scattered throughout the body.

The sole and specialized business of each of these sense organs is to start a nerve impulse going in the nervous system. Normally a sense organ does not respond to a stimulus which is not appropriate to it. The rods and cones in the eye do not start nerve impulses when sound waves are present.

2. Connectors. The central nervous system and its closely related autonomic nervous system are connected with each sense organ by *sensory* nerve fibers and with each muscle and gland by means of *motor fibers*. The anatomy of this vast complex system is still only partly explored, and the way in which each specific part operates is even less well known. The nervous system is the organic means of controlling and coordinating the vast possibilities of response that are man's heritage as a human being. The nervous system has sometimes been likened to a complex telephone system in which the nerve impulse is comparable to the electrical impulse in the telephone. Beginning at any sense organ, the impulse may be dispatched by means of the complex connections within the nervous system to any gland or muscle in the body. As the blood stream circulates through the body, it

carries the product of the endocrine glands to each of the other parts of the body. It is thus roughly comparable to a vast, complex postal system, actually carrying a substance from one place to another. When these substances reach certain parts of the body, they have a direct stimulating or depressing effect upon those parts.

An illustration will help to make this clear. When the adrenal glands are aroused to activity they discharge into the blood stream a substance called adrenalin. This substance is carried by the blood to all parts of the body where it has a different effect upon different tissues. It has the direct effect of causing the liver to set free increased amounts of blood sugar for use in increased muscle action. It causes the walls of the arteries to contract, which results in increased blood pressure. It also makes the blood itself clot more readily when exposed to the air. Hormones from other glands have their effect upon various other organs of the body and so help to determine the nature of behavior.

3. Effectors. When the nerve impulses make their way through the nervous system, they arrive eventually at some muscle or gland. Each of these muscles or glands has a special function. They differ greatly in size and position and in other ways, but they are all alike in being limited as to the kind of responses they can make. The only change in their state of being that can be produced in response to nerve impulses is that of *responding either more or less actively* than before. The salivary glands can produce only more or less saliva in response to the appropriate stimulus and resulting nerve impulse. They cannot produce tears.

Out of this "more and less" factor in the response of each of the millions of muscle and gland cells in the body is built that enormously complex thing called human behavior. Myriads of different combinations of these minute responses are possible and these become part of the many patterns of response involved in man's behavior.

What Are the Motives of Men and How Do They Come to Be as They Are?—In this chapter the problem of motivation

will be divided into two parts dealing with overlapping but not identical phases of human motivation. These two phases will be called *physiological motivation* and *socially conditioned motivation.* Some psychologists prefer to consider the two phases together. Their reasons for so doing and a word of caution are in order at this point.

All motives, as they are here considered, are both physiologically and socially determined, at least for the human adult. Some are primarily physiological and are more or less innate. Others are primarily socially conditioned, depending for their forcefulness in a large degree upon man's social relationships. It is convenient to consider these two groups of motives somewhat separately, recognizing, however, that there is no sharp distinction between them. Each group partakes of the characteristics of the other. Therefore, a motive will be considered as falling into the first group if its innately determined characteristics are the most prominent and into the second group if its qualities as a motive are predominantly determined through experience with other human beings. In the nature of things there will be some motives that might properly be considered in either of these classifications, and in discussing a motive in one group it will sometimes be advisable to consider the qualities it possesses that characterize the other.

Such a grouping of motives will also serve another purpose in the plan of this book. The consideration of the physiological type of motivation is a continuation of the discussions occurring in the chapters preceding, while that pertaining to the socially conditioned variety will relate this discussion to a chapter that comes later and deals more specifically with the way in which behavior is modified by experience.

Motives Arising Directly from Man's Bodily Conditions

A Well-known Motive Examined.—Jean Valjean, the principal character in Victor Hugo's immortal story, *Les Misérables,* was sentenced to nineteen years' imprisonment in convict ships for stealing a loaf of bread. Whether such a man ever actually

received such a sentence is beside the point. Men will do almost anything for food under certain conditions. Why? The answer will be found in terms of both physiological and social motivation. Here the physiological aspect will be considered, since in this instance it is a physiological response that is chiefly involved.

When a normal individual has gone without food for three or four hours, certain types of stomach movements begin. These movements of the empty stomach have been shown to occur simultaneously with what are recognized consciously as hunger pangs. They are accompanied by a general condition of restlessness. Wada [1] in her experiments showed that, whether the individual was awake or asleep, this restlessness was observable. The strength of grip of the hands is greater at the time of this condition called hunger, and the ability to do mental work is increased. These characteristics are only a few of the results of the hunger drive.

Habit has a great deal to do with one's being *aware* of these hunger pangs. For those who are habituated to a 12:00 o'clock lunch and are asked to attend a 1:00 o'clock luncheon, the feeling of hunger is a very conspicuous part of their behavior. They have an unusual amount of restlessness; they enter into animated conversation and move about animatedly; they light their cigarettes and puff on them in an almost feverish way. They give evidence of a tension, of which they are probably not aware, by the very way in which they sit forward in their chairs, the way they talk, and the restless way they glance around or move from place to place.

Notice the same group after they have eaten. To all casual appearance, they may be doing the very same things that they had done before luncheon. Some may be smoking, but notice the difference in the way they attack their cigars or cigarettes. The conversation may be animated, but nevertheless there is noticeably less tension, and less restless movement than there was before luncheon. Drowsiness may be very evident within a short time.

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[1] Tomi Wada, "An Experimental Study of Hunger in Its Relation to Activity," *Archives of Psychology*, 1922, No. 57, pp. 1–67.

To show that such activity as this is not altogether socially conditioned, it is only necessary to observe an infant who has gone without food for a few hours. There are vigorous arm and leg movements. Crying begins; it is intermittent at first, then becomes more regular and more intensive. Note the same infant after it has finished feeding. If sleep does not follow immediately, at least the observable behavior is different. Arm and leg movements are fewer and different in character, and if there is vocalization, it is almost sure to be of the gurgling, cooing kind.

It is extremely difficult to measure quantitatively in human beings the behavior caused by such a motive as the hunger drive, because socialized experience complicates human motives. Civilized human beings, no matter how hungry they may be at such a luncheon as was described above, do not rush up to the table and grab food from the plates to appease their hunger. There are too many socially conditioned motives or drives acting in the other direction. Hence it is difficult to approach such human motives with measuring devices.

The problem is simpler with lower animals. Some experiments have been carried out by Moss and others to measure the intensity of the drive due to hunger, in rats. Moss [2] made a cage consisting of two compartments separated by an electrically charged grid over which the rats could pass, but only at the expense of being electrically shocked. The rats were placed in one compartment, food in the other. The voltage could be measured and the length of time which the rats would stay away from the food before crossing the grid was taken as a measure of the forcefulness of the drive. In the same way the forcefulness of other kinds of motives was measured. However, very few conclusions can be drawn from these experiments as to the forcefulness of the hunger drive in man, largely because of differences in the two species which are due to social conditioning, but they do indicate that such a motive as hunger has a very definite physiological basis.

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[2] F. A. Moss, "Study of Animal Drives," *Journal of Experimental Psychology*, 1924, Vol. 7, pp. 165–185.

THE DESPAIR OF THE BREADLINE

How long will the hungry man's socially conditioned pride keep him out of the "breadline" when he is destitute? Would it be longer for some persons than for others? Why?

General Characteristics of a Motive.—It is now possible to state the general characteristics of motives. There is room for an honest difference of opinion concerning what a motive is, but the following definition is one which seems to fit the facts and has the advantage of being workable. *A motive is an urge to begin or to continue a characteristic type of action which leads to the reestablishment within the body of a balance, the disturbance of which sets the motive into action.* Some psychologists make a distinction between the "drive" and the "motive." However, no attempt will here be made to distinguish from each other the terms drive, urge, craving, and motive.

According to this definition the basis of every motive is an upsetting of some organic balance which has been previously established at least temporarily. These balances may be involved in what Dashiell [3] calls "tissue needs," or they may be the result of learned or acquired types of behavior. Hunger, thirst, and sexual tension are examples of physiological conditions involved in "tissue needs." Social approval and gregariousness are examples of learned or socialized habits, which will be discussed more fully later.

There is a forcefulness about any type of activity once begun which tends to make it persist. Once a motive becomes active, it dominates the individual's behavior until either the disturbed equilibrium is reestablished, or some other powerful motive interferes and dominates the behavior. One of the most important characteristics of either habits or the so-called instincts is this tendency to continue when once started.

A number of systems have been outlined to explain human motivation, but most of them have employed too much simplification to deserve much credence. Any scheme which seeks to explain the general characteristics of human motivation must be broad enough to fit all sorts of behavior and must at the same time remain within the limits of natural law.

What the reader must understand is that man is endowed, not with a few fundamental and universal drives to action, but

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[3] J. F. Dashiell, *Fundamentals of Objective Psychology*, p. 233 ff.

with a great variety of motives. The reader will be aided in understanding himself if he can see that he behaves as he does because he possesses a particular kind of organic structure. This organic structure is the joint product of what he has inherited, what he has experienced, and the state of maturity he has reached.

Other Motives Primarily Due to Organic Conditions.—Sensations of thirst can be rather definitely localized. The mucous membranes of the pharynx, nasal passages, and mouth seem to be the points most noticeably affected. The mucous glands of the throat and nose secrete less freely than usual, and the result is a feeling of dryness in these parts. If thirst goes unquenched for a long time, those mucous membranes that can be observed become dry and inflamed. The flesh underneath becomes swollen, and extreme discomfort results. There are fewer socially conditioned factors in the satisfaction of the thirst motive than in the case of hunger. As yet, however, no one has attempted to measure the forcefulness of this motive for human beings.

Another physiological condition within the common experience of everyone is the craving for rest when fatigued. The feeling of fatigue may include the whole body or it may be somewhat localized when certain muscles have been overstrained in a fatiguing exercise. The exact physiological cause for this is not definitely known, but it is assumed to be the accumulated by-products of metabolism.

When the normal individual is rested, there is an urge toward increase of activity. The physiological basis of this urge is even less understood than it is in the fatigue motive. But whatever the underlying conditions may be, the need for activity, like the need for rest, is subject to individual and social conditioning.

Effects of Drugs as Motives.—There is another kind of acquired mode of behavior that deserves special attention. "Drug habits" can only partly be accounted for in terms of the usual explanations of habit formation. The drug substances themselves play a rôle similar to the chemical factors common to motives that are essentially physiological in nature. An extreme example is the person addicted to an opiate. Anyone familiar

A DRUG ADDICT

This monkey has been experimentally habituated to large doses of morphine. Above, after 25 hours since the last dose. Below, 30 minutes after receiving a large dose of the drug. (Reprinted by permission from *Comparative Psychology,* edited by F. A. Moss. Copyright 1934, Prentice-Hall, Inc., New York.)

with a case of this sort is well aware of the almost terrifyingly dynamic qualities of such a habit. There seems to be literally nothing that one thoroughly accustomed to the use of such a drug will not do, when deprived of it, to obtain a supply of the substance. In a "drug habit," aside from the usual effects of learning, there are physiological effects similar to those involved in fatigue or illness. The drug has a different kind of effect upon certain tissues of the body than that involved in the usual learning process.

Somewhat related to the habits of using opiates are such habits as the drinking of coffee, tea, and other drinks containing caffeine and similar substances. The fact that the effect of caffeine is roughly in inverse proportion to the body weight of the user indicates that the chemical substance has some significant physiological effect upon body tissues. A man who is accustomed to a cup of coffee upon arising in the morning may have a miserable time if circumstances prevent him from obtaining it.

Another example of the forcefulness of a habit of this sort is smoking. Here both physiological and socially conditioned factors are involved in an important sense. Consider the case of a man who is accustomed to his after-dinner cigar. He arises from the dining table and goes to his smoking stand only to be reminded that he forgot to replenish the supply. The nearest cigar store is several blocks away, and a storm is raging. He goes to the door and looks out, but decides that it is foolish to go out into the storm for a cigar. He decides to use this occasion to assure himself that he is master of the habit. Note how he is attempting by his rationalizing to motivate himself to behave as his good judgment tells him he ought to behave. He goes to his accustomed chair, takes the evening paper, and settles himself as usual to read. In half the usual time he throws the paper aside and wanders around the room. He notices a pencil mark on the wall and gets himself all worked up emotionally about the misbehavior of his young son. His remarks about his wife's ability to control the child might better have been left unsaid. She resents the statement, and a warm argument ensues until she goes to her room, leaving him with no one to abuse. He tries to read

a book but finds it uninteresting. He tries the radio, but the programs are "all rotten." Finally he remembers that there was a minor business matter that he has not attended to. He decides to take the car and finish it. Incidentally, he drives by the store and remarks to himself, "As long as I'm going this way anyway, I might as well stop and get some cigars." Having lighted the cigar and puffed contentedly on it for a minute or two, he feels that the world is a little more rosy. He thinks, "Maybe I was a bit short in speaking to Mabel; I'll take her that box of candy. That's the kind she likes particularly." And so, having conformed to habit, he is free to resume a more or less routine type of behavior.

Individual Habits as Motives.—The importance of the effects of learning in the motivation involved in the preceding incident raises the question: To what extent is habit, in the sense of being the result of learning, a type of physiological motive? The physiological and anatomical factors involved in ordinary habit formation are not precisely known, but it is fairly well agreed that certain structural changes do occur during learning. Although it is certain that most human learning takes place in social situations, it is enough for the present to consider habits as motives in a physiological sense, leaving to a later section of this chapter a discussion of the socializing effect of group activity in determining the nature of socialized motives. This is an instance of a motive that might appropriately be considered in either group.

Almost any kind of a routine habit may, when interfered with, produce a result similar to that of cigar smoking. The man who comes home and finds the furniture moved, unless he is habituated to having it moved, and the woman who looks in the accustomed place for the scissors only to find them gone are both in for an unfortunate few minutes. The more thoroughly the habit is established, the more forcefully it operates as a dynamic factor in controlling behavior, as the following example illustrates.

Several years ago a teacher of home economics arranged a meat-cutting demonstration for the members of her classes and their mothers. The butcher brought a fore and a hind quarter of beef to the classroom. Everything proceeded beautifully until he

reached for his saw. As was his habit, he put his hand over his head to get it, but, of course, it was not there. He laughed that off satisfactorily. In the course of the next twenty minutes he did it no less than eleven times. By that time he was definitely embarrassed and confused. In that embarrassment he finally cut his hand severely, a thing which he had not done for several years. His entire series of composed, coordinated movements had been upset by interference with a single point in his routine.

Relationship Between Endocrine Glandular Activity and Motives.—In several of the motives which have been discussed, such as the hunger, sex, and maternal drives, the glands have been shown to play an important rôle. The endocrine glands seem to be especially important. As examples, two of these glands and their products, the thyroid glands and the gonads or sex glands, will be briefly discussed. The influence of these particular glands upon behavior is fairly well understood.

When the thyroid gland is overactive, providing more thyroxin than is needed for the smooth running of the body, certain general characteristics of behavior become evident. The hyperthyroid person is easily excited, has a tendency to excesses of emotional response, and has poorly coordinated muscular responses. The whole of such a person's behavior is typified by instability, and this is so conspicuous as to color his entire personality.

In an extreme case of this sort, a patient in a prison hospital was unable to pick up a key from a flat narrow surface. In his attempt to do so he knocked the key to the floor where he eventually secured it by getting it against his foot. This patient was a deserter from the army in peace time. His army record had been good until a few months before his desertion. Gradually he began to do things not expected of the professional soldier. He would start to carry out an order or an errand and might end up by doing something entirely different. This, of course, got him into military difficulties. His officers lost patience with him and subjected him to the usual punishment at their command. He always seemed to be penitent for his military misdeeds, but he

insisted that he did not know why he behaved as he did. Finally the situation became unbearable to him, and he simply walked away from his post. Several months later he was picked up by railroad police while attempting to board a freight train. According to his own account, the intervening months had been spent in starting to do a number of different things only to abandon them without apparent reason. In fact, his statement was that usually things were going well enough, and he did not know why he changed his mind. He was hospitalized and treated surgically and otherwise for an overgrown and overactive thyroid. He was discharged from the army much improved in general health and apparently also in the general stability of his behavior.

The female gonads secrete several substances. One of these, *oestrin,* is now fairly well known. When the female gonads are removed or destroyed by disease, the woman's femininity is soon replaced by a more masculine physical aspect and a more or less masculine mode of behavior. In reality the tendency is toward a neutral kind of behavior closely approximated by the male whose gonads no longer function as endocrine glands. Experiments with some of the lower animals indicate the possibility of alternating male and female types of behavior by controlling, surgically, the presence of these substances within the body.

It should be evident by this time that anything that influences the anatomical and physiological aspects of man's organism has a direct influence upon his behavior. The stimulus that sets a motive going may be any natural energy to which man's organism can respond. How man will respond to the stimulus depends upon the organization of his whole system of energy, including the influence of his inheritance, his maturity, his experience, and the bio-chemical conditions of the organism as a whole.

Motives Arising from Man's Social Experience

Another Well-known Motive Examined.—On an island off the coast of South America in the Caribbean Sea is a French penal colony. Here are sent convicts who usually live in groups.

Occasionally, as a special punishment, a prisoner may be sentenced to spend a period in solitary confinement. He is then put in a dungeon where he does not even see the guards or the person who brings his food and water. It is the most dreaded of all punishments, and it is reported that prisoners thus confined often "go mad" or even die of lack of companionship.

Why does the deprivation of human companionship so seriously disturb the normal person's habits of living? In the past, it has been customary to assume, by way of explanation, that man like the lower animals has an instinct for gregariousness. But to use the term "gregarious instinct" as a means of explaining why man is normally more contented in the company of his fellows is simply saying that man tends to live in groups because man tends to live in groups. It does not explain anything.

Instead of accepting such an unsatisfactory explanation, an effort should be made to find a better reason why men group themselves into social communities. Such an effort should include an examination of the infantile and childhood experiences of normal people. The human infant at birth is completely helpless, and if left to itself it would die in a few hours. Its very life, to say nothing of its happiness and well-being, depends upon care by adults. It is fed, warmed, and protected by adults. It is praised, warned, and punished by them. Almost everything the infant and child does is socially conditioned; that is, all its responses depend in some degree upon the stimulation provided by the behavior of its social group.

Parents are often heard to remark, "I don't see why John won't play in the sand pile by himself. He must always have someone around to talk to." There may be differences in degree of inherent sociability, but it is not strange that the child should insist upon being around or near others. All his short waking life is normally spent in the presence of others. One cannot, therefore, reasonably expect him to be otherwise than habituated to the presence of others. Nor is there any reason for supposing that such a habit is less important as a motive than are those considered in the preceding section of this chapter.

Frequently it may be noted that a child is contentedly engaged in some apparently solitary play activity; then suddenly the child notices that the other children or the adults who were near have gone. Very soon, sometimes immediately, the child becomes uneasy and restless. The play activity no longer arouses in him the same enthusiasm as before. What has happened? Simply that a very important part of the total environment has changed. The child is habituated to the almost constant presence of others. When this habit is interfered with, the same thing happens, in a general way, that occurs when any other regular habit is disturbed.

During youth and adult life this habit of being with others is usually intensified. Need it be surprising then, knowing what is known about habits as important motives, to find the child is uncomfortable when he is by himself? As the child grows older, he normally becomes habituated to being alone for short periods of time, especially if he knows that others are within reach. But the average person of any age, if deprived of the society of others, will require a very considerable readjustment to enable him to endure his own company. Several college students have reported that they cannot even study alone in their rooms for an hour without at least having the door open as a means of suggesting the presence of others.

Thus it is evident that man during the entire period of infancy, youth, and adulthood is required to control much of his behavior in terms of the actions or the presence of others. This controlling force may be called gregariousness, but whatever it is called it should be recognized that it is largely learned and that it is an important means of motivating behavior.

Man's Need for the Attention and Approval of Others.—Children constantly seek to gain the attention and approval of others. Several years ago in a city school system there was a seventh-grade teacher who at the beginning of the year drew up a set of rules for conduct. One of these authoritatively forbade the chewing of gum in the schoolroom. For several reasons, aside from these rules, she became quite unpopular with her

pupils. One day there was a knock on the door of the superintendent's office, and one of the boys from this teacher's room entered. When asked what he wanted, he said that the teacher had sent him there because she thought he had been chewing gum, although he maintained that he had not been doing so. He was told to sit down and wait until the end of the period. About five minutes later another boy appeared with much the same story to tell. He was also asked to wait. Before the end of the period a third boy from the same classroom appeared. When asked, "You weren't chewing gum, either, were you?" he seemed surprised, but he also insisted that he was innocent. No one knows how many more would have been sent to the office had the period not soon ended.

Investigation cleared up what little was not already apparent. The teacher had detected a girl in the act of chewing gum and had commanded her in an imperious manner to march to the front of the room and put the gum in the waste basket. One after another these three boys had thereupon made themselves conspicuous by appearing to be chewing gum. When commanded to come forward, they had done so, but had no gum to deposit. The first time there were suppressed titters from the other pupils. This increased to open snickers when the second boy was detected and to a full laugh when the third boy came forward without any gum.

That poor, unfortunate teacher was quite unable to see that her disapproval of gum-chewing was of absolutely no avail as compared with the attention and approval that these three boys were able to get by playing up to the situation she had created. They had secured the coveted approval of their group. Her disapproval did not matter. They were even willing to risk punishment from the superintendent rather than forego the satisfaction of approval of their fellows.

Why will athletes endure long hours of training and violent physical exertion, sometimes for months at a time, for the sake of making a place on the team or even on the substitute's bench? The answer may be partly that they enjoy the physiological exhilaration of the exercise of a physically well-conditioned body.

Partly, also, it may depend upon another socially conditioned motive, the desire for mastery; but undoubtedly for most athletes much of the motivation would be lost if the contests were held behind locked gates, if the newspapers published no pictures and no accounts of the games, and if no pins, sweaters, or emblems were given to the participants. They are, in this respect, like the boys mentioned in the preceding incident. It is the approval of the group that counts.

The bully at school often gets his attention in an asocial or even anti-social manner as a compensation for the usual attention available to the brighter or less socially restricted pupil. Temper tantrums are not often resorted to by children or adults as a means of getting attention, but some persons make a practice of that sort of behavior when it brings them the desired results. Extreme argumentativeness sometimes works the same way. The term "exhibitionism" is usually reserved for certain abnormal sex practices of adults and children. With children, at least, the prime motive of such behavior is usually that of seeking attention that is not easily obtained by more usual methods.

During illness a great deal of attention is usually given to the one who is ill. As recovery nears completion, this excessive attention is withdrawn. The convalescent has a set of habits to break or a readjustment to make following an illness of any considerable period. This sometimes becomes a very important part of convalescence, both for children and adults.

Another interesting way in which some adults get attention is through membership and office-holding in secret ritualistic organizations. They attend faithfully, perform routine duties, and eventually are elected to a minor office. This often automatically carries them to the higher offices where they have a chance to become somebodies of importance. Their periods of office-holding over, they then retire to the mild glory of being Past Great and Exalted Something-or-Others.

The origin of this motive of gaining social attention and approval seems to be about the same as that of gregariousness; that is, it can be explained in terms of social conditioning in infancy, childhood, and youth. Many of man's physiological needs are

gained by getting the attention and approval of his social group. This is true in the family, in the school, and in the groups out of school. When the group approves, he gains his end: when the group disapproves, he fails. He comes to know through experience what will and what will not get approval. Thus by conditioning, the securing of approval comes gradually to be associated with emotional responses.

There are some seeming exceptions to such a general principle. There are those who live in a world more or less apart from their fellows. They spend hours or even years in perfecting some invention, in securing some experimental data, or in doing some other piece of scholarly work. Usually in such cases the approval of a small group is to them of more worth than the approval of the larger group. There are now a dozen or more professional journals in the field of psychology. Editors of these journals say that there is more good material offered for publication than they can possibly print. It is only fair to recognize that one of the motives behind much of the experimentation and writing is the approval that is sought from one's fellow-workers.

There are also the recluses who seem to have withdrawn from society as a whole, and apparently care very little for the approval of others. The hermit, for example, seemingly cares nothing for the approval of society. A closer examination of how he spends his time will reveal that it is a case of emphasizing one habit almost to the exclusion of another. Sometimes he engages excessively in the habit of reading. In some cases religious zeal induces a person to withdraw from society and neglect the approval of the world at large in favor of a restricted group within the church. In addition the presumed approval of a Supreme Being may come to be habitually substituted for the approval of society. Thus are martyrs made. Even such seeming exceptions emphasize the importance of social conditioning.

An Outline Summary

1. Man's behavior as related to his structure.
   A. The structure determining behavior in the psychological sense can be conveniently classified as:

1. Receptors—the sense organs through which natural forces initiate responses,
2. Connectors—the nervous system through which the responses are integrated, and
3. Effectors—the muscles and glands which actually make the response.

B. All of man's behavior can be accounted for in terms of the variation and integration of the activity of these structures.

2. In general, motivating forces are of two kinds:

A. Physiological motives
1. Have their origin in the functioning of the original organic structure, and
2. Are modified to an important degree by experience and by maturation.
3. Some substances (drugs) when taken into the body have an important effect upon the structure and hence upon the behavior.

B. Socialized motives
1. Have their origin in terms of learning (habits are characteristically dynamic).
2. Some habits are individually unique and their exact origin differs among individuals, while
3. Some habits are practically universal, arising out of common social experiences with common stimuli.

Problems for Further Thought

1. What is the most probable reason why some people do not hear such high-pitched sounds as that made by a cricket chirping? Why do not those who are color-blind see the colors seen by others? Explain why such persons are often quite unaware of their deficiencies.

2. Look up material relative to the effect upon behavior of abnormalities of any one of the endocrine glands and report the results of your findings. Pay particular attention to the matter of behavior. (In the suggested readings below, note how Berg, Dorsey, and Hoskins treat this point.)

3. From among your circle of acquaintances select two, one of whom is extremely distressed and annoyed by even the thought of possible disapproval. Select another who is as much the opposite as you can find. Compare their behavior in social situations that are as alike as possible. Note the behavior differences themselves and the differences in the way the groups react to them. Explain as fully as your information about these two persons will permit "how they got that way."

4. Cite several instances from your experience or your observation of the operation of the urge to rest and recuperate when fatigued and, to be vigorously active when well rested.

5. When one has developed a habit of working vigorously for certain fixed hours each day, and of resting at certain other fixed hours, what significant modifications of the innate urges mentioned in Problem 4 above are clearly observable? Illustrate.

6. How can the rather universal type of behavior that is commonly called curiosity be explained as an instance of "universal habit"? Explain how the common characteristics of every person's life in childhood would tend to produce this effect. Explain also the differences in degree of curiosity shown by different people.

7. Illustrate the dynamic quality of habit from several experiences or observations of your own. They need not be striking or unusual instances but should clearly embody evidence of the tendency of habit patterns to go through to completion when once they have been set in motion. It may be helpful here to recall acts automatically carried out when one is "absent-minded."

8. Some of the instances cited in Problem 7 may have been somewhat embarrassing because the habitual behavior pattern was inappropriate when it appeared. But are all habitual repetitions disadvantageous? Make a list of a dozen or more habitual acts that are socially or individually useful because they do go through to completion unattended when once they have been set going.

Suggested Readings

Berg, Louis. The Human Personality. New York, Prentice-Hall, Inc., 1933. "The Glandular Basis of Personality," Ch. IV, pp. 48–81. A discussion of the rôle of the endocrine glands in determining general behavior characteristics.

Cannon, W. B. Bodily Changes in Pain, Hunger, Fear, and Rage. New York, D. Appleton-Century Co., 1922. Ch. XIII, "The Nature of Hunger,"

pp. 232–266. Describes some of the experimental work and presents results showing the nature of the bodily changes that take place in hunger.

Dorsey, George A. Why We Behave Like Human Beings. New York, Harper & Bros., 1925. Ch. IV, "The Endocrine Glands," pp. 201–262. Discusses in a popular and easy style some of the influences of the endocrine glands upon behavior.

Gates, A. I. Elementary Psychology. Rev. ed., New York, The Macmillan Co., 1928. Ch. II, "The Reaction Hypothesis and the Receiving Mechanisms," pp. 33–58; Ch. III, "The Connecting Mechanisms," pp. 59–80; Ch. IV, "The Reacting Mechanisms," pp. 81–105. These three chapters furnish a simplified statement concerning the bodily mechanisms of behavior which is included in the introductory section of the present chapter. Ch. VIII, "Dominant Human Urges," pp. 216–244. This chapter discusses in a similar simple way the variety of urges or mainsprings of human activity.

Hoskins, R. G. The Tides of Life. New York, W. W. Norton & Co., 1933. This is the most up-to-date and authoritative statement available to the reader concerning the complex rôle of the endocrine glands in determining human behavior.

Krueger, E. T., and Reckless, W. C. Social Psychology. New York, Longmans, Green, and Co., 1931. Ch. IV, "The Theory of Motivation," pp. 142–170. Discusses the general problem of motivation, including the place of the social motives.

Murphy, Gardner. General Psychology. New York, Harper & Bros., 1933. Ch. IV, "The Simpler Motives," pp. 46–64. Deals only with the physiological motives.

Perrin, F. A. A., and Klein, D. B. Psychology. New York, Henry Holt & Co., 1926. Ch. IV, "The Motivation of Behavior," pp. 137–150 and 183–193. These sections of this chapter deal with the physiological drives and social motives, respectively.

Smith, Stevenson, and Guthrie, E. R. General Psychology in Terms of Behavior. New York, D. Appleton-Century Co., 1921. Ch. IV, "Coenotropes" (Universal Habits), pp. 134–157. Emphasizes the rôle of learning in many of the motivating forces previously called instincts.

Thomson, M. K. The Springs of Human Action. New York, D. Appleton-Century Co., 1927. This is a general treatise on human dynamics. A number of chapters are especially pertinent to the problem of this chapter.

Chapter 7

HOW DOES MATURITY MODIFY BEHAVIOR?

How Did Betty Learn to Walk So Rapidly?—Betty was almost a year old and had begun to pull herself up to her feet alongside of chairs, when her parents discovered that her right hip was dislocated. The doctor was called at once, and for nearly a year Betty was confined in a heavy cast which was so constructed that it was impossible for her to stand on her feet or put any weight on her right hip. Betty was apparently as happy and active as any other child during her second year of life, except that she could not run, walk, or even crawl in the usual baby fashion. She did get around the house with a peculiar rolling, hitching movement that was as efficient as it was unusual. She even managed to get up and down stairs by herself before the end of the year.

When she was nearly two years old, the cast was removed, and within a week one would not have suspected that she had never walked before. With a week of practice she was apparently as efficient in her method of walking and running as were children of her own age with the usual normal experiences. She started to walk at once after the removal of the cast, although her first steps were somewhat like the first steps of a normal child several months to a year younger than she. The significant thing is that the improvement was so rapid. The question naturally arises: How could this child master the process of walking so rapidly that in less than a week she had caught up with the norms for her age in this particular kind of behavior?

It is the purpose of this chapter to answer this question and to examine the effect upon behavior of maturation of the bodily structure. In the course of this examination, it will be difficult and often impossible to distinguish the results of maturation—the pure, innately determined growth—from the effects of learning, because in the usual experience of the normal child the struc-

tural changes in the body due to learning and those due to maturation go on at the same time.

Some Experiments with Lower Animals.—Many experiments have been conducted with the lower animals because of the freedom with which such animals may be subjected to an experimental environment. Spaulding kept four swallows confined in a cage so small that it prevented any possibility of wing action even faintly resembling flying. These young birds were confined from the time they were hatched until those of the same brood left in the nest had grown up and were flying with the skill of the adult bird. When the birds which he had kept in close confinement were released, two of them were able to fly nearly as well as those reared in the usual way. The other two were also able to fly at once, and while they were noticeably less adept, in a very short time even this difference was indistinguishable.

When chicks first come out of the shell, a trait of behavior that is universally present is the pecking response. Newly hatched chicks will not only peck at grains of food, but will indiscriminately peck at the toes of their companions or at ink spots on a paper under their feet. They will even peck at the eyes of the chicks about them. However, this pecking is far from accurate. At first they are hardly 50 per cent successful in seizing a grain of food in their bills so that it can be swallowed. As the days of the first week go by, chicks under normal conditions improve so rapidly that by the seventh day of life they average above 80 per cent of success in the pecking response. Here again the question is whether the improvement is the result of learning or of maturation. Breed and Shepard first, and others since, have endeavored to answer this question. A group of chicks from a newly hatched brood were prevented from pecking during the first days of life by keeping them in total darkness and feeding them by hand. Some were subjected to these conditions for one day, some for two, some for three, and some for as long as four days. When these chicks first began to peck, they were in each case distinctly less perfect in their response than were those of the same original lot which had been permitted to live and grow

under normal conditions. The longer the chicks were kept in the dark the more retarded they were, as compared with the control group, but in each case the handicapped chicks were more successful in their first pecking response than the control group had been when first hatched. Even without any experience in pecking, their performance had improved somewhat, but it had not been able to reach the degree of efficiency attained by the chicks with normal experience. A most interesting observation is the fact that by the end of one week of life the chicks from all the groups in the experiment were about equally successful in their pecking responses.

In these experiments with forms of animal life other than human beings, the results seem to be substantially the same as in the case of Betty. An experiment of another kind is described below dealing with human infants in the development of a relatively complex type of behavior.

Gesell's Experiment with Twins.—Gesell [1] used as the subjects of an experiment a pair of identical twins. These twins were called in the experimental report twin T and twin C. When they were 46 weeks of age, twin T began a six weeks' period of training in climbing stairs consisting of four treads leading to a crib. The speed and coordination of movements in climbing showed a very definite improvement during this period of training. In the early stages three or four complete trips up the staircase in a ten-minute session represented a typical performance. In the 25th session, during the fifth week, twin T reached a maximum of ten trips up the staircase in the ten-minute practice period. During the six weeks' period of training, twin T scaled the staircase a total of 126 times and showed a skill considerably greater than twin C's. These twins were also trained in a similar manner to handle cubes. At the close of the training period, the performances of the twins were very similar.

From this and similar experiments Gesell suggests that growth of the individual due to changes in maturity cannot be

[1] Arnold Gesell, "Learning and Growth in Identical Twins," *Genetic Psychology Monographs*, 1929, No. 1.

permanently offset by training. The effect of training may be very important; in fact it usually is. However, if the training is at the marginal level of maturity, it seems to be less productive than the effect of sheer maturation. Thus, one twin by reason of practice seems to become superior to the other in the motor performance involved in this experiment. This gain in efficiency at the end of a long period of training is, however, quickly offset by training the other twin, who in the meantime has also been maturing. This seems to be true only when the behavior is sampled at the lower margin of possible performance. In this respect, it is quite like the case of Betty.

Factors Involved in Maturation Difficult to Discover and Measure.—In such experiments as Gesell's and in the case of Betty, observation of improvement in the absence of opportunity to learn is limited to a single case or two. Consequently, the results are not very convincing. But they do agree with each other and with the experiments with the animals, in which larger numbers were used. In the case of both lower animals and children, there may have been some learning. Betty had been very active during the time she was in the cast. She had certainly had much practice in whatever is involved in keeping one's balance and in other phases of motor activity. These indirect learning factors are impossible to single out and control in an experiment. Added to this general difficulty is the ever-present one of the unwillingness of parents to permit their infants to be hampered in their movements over the period of time necessary for such experiments.

It will be well now to return to the question raised above and state it in a somewhat different way. How much of the improvement in Betty's ability to walk, during the year in which she was in the cast, was due to pure maturation and how much was due to the kinds of indirect experience just mentioned? Or, stating the question in a still more general form, How much of the change, of behavior occurring before the individual reaches the mature, adult level is due to maturation, and what part of it can best be accounted for in terms of learning?

Child pivoting; age 32 weeks; characteristic behavior of children of this age.

First steps; age 52 weeks; note the lack of sureness in maintaining balance that is characteristic of learning to walk.

Testing an infant; age 16 weeks; note the relation of the thumbs to the fingers and the child's attitude to the block on the table.

THREE INTERESTING STAGES OF INFANT BEHAVIOR

(By courtesy of Arnold Gesell, The Clinic of Child Development, Yale University.)

Nature of Changes in Structure During Maturation.— Changes in behavior due to maturation may be classified into two groups, although it is possible that these are simply two different ways of looking at the same kind of change. In any event, the changes of behavior are undoubtedly due to changes in bodily structure. One group of changes seems to be due to the growth in size and change of shape of the parts of the body. The other seems to be characterized by an increased *ease-of-operation* or *ease-of-arousing* a bodily response. This second phase of maturation manifests itself in an increased smoothness and integration of the responses. It is probable that this second phase depends chiefly upon the functional maturing of the nervous system. Through the period of infancy and early childhood, these two aspects of maturation are more easily distinguishable than in later life.

All the organs of the body are present at birth. This presence of structure extends to very minute details. At the time of birth many of the cells and organs are far from mature in size and are far from their mature ability to react. Maturation is a process of development of the structures already potentially present from the time of fertilization. Even a casual observation of the body of the infant at birth will indicate the impossibility of walking. The legs are altogether too undeveloped to sustain the weight of the body. The infant's body must mature in the sense of increasing its size and strength before walking can take place.

As for the other phase of maturation, one must be content with an examination of the increasing complexity of responses. The inner structure of the nervous system cannot be examined. From the first few days of life the normal infant responds to pressure on the soles of the feet by a down-thrusting movement. This is only one of the necessary elements of the total pattern of behavior involved in walking. One may also note that there is very early evidence of some coordination of leg movements. At first there seems to be more of a tendency for the legs to move simultaneously than alternately, but this is soon reversed. By the age of three weeks the child may make walking movements if the body is supported so that the feet just touch a sur-

face. Here there is further evidence of integration of increasingly complex behavior that cannot be accounted for simply by an increase in size and strength. In the same way, progressively more coordinated movements can be observed in the trunk and neck and other parts of the body involved in maintaining balance.

Mothers and nurses frequently observe that the infant begins to walk suddenly. Often, less than a week from the time of the first step taken alone, the infant is making its way successfully, walking where it crept before. This suddenness indicates the necessity of the completion of a certain minimum level of maturity in both these phases of growth. Often in the normal course of events the size and strength of the muscular parts are sufficiently mature before the necessary coordination is present for such a complex muscular activity as standing or walking without support. Occasionally the reverse is true, and the infant is prevented from walking, not by inability to make the necessary movements, but by lack of sufficient strength. This is relatively rare and is most often the result of gross malnutrition or disease. In any event, the child does not walk until both phases of maturation are sufficiently advanced.

In the case of Betty, opportunity was denied for practicing walking for a year. During this time Betty's body had been growing quite normally both in size and to some extent in strength of muscular response. Presumably, too, the various parts of the nervous system were developing in the normal manner. In spite of this, it is very important to note that, both in this case and in the other experimental studies cited, some practice was necessary to perfect the response.

These two phases of development will be called *gross bodily maturation* and *functional maturation of the nervous system.* It must be recognized, of course, that these two names are a bit misleading because not all the structural characteristics included in the former are in any sense gross. It must also be recognized that the functional maturation of the nervous system is after all just as much structural as the development of the muscles or the skeleton. Much more is known about the maturation of the body in its gross structural sense than about the functional maturation

of the nervous system. A few of the known facts about each of these two phases of maturation will be summarized in the following paragraphs.

Gross Bodily Maturation.—Gross structural maturation is not a single unitary thing. There are many phases of maturation going on at the same time but at different relative rates. The ossification of the skeleton has progressed by the time of birth to the point where most of the long bones of the body consist of true bony tissues. This ossification continues through childhood, and by taking radiograph pictures of the wrist, the relative degree of its progress in the wrist bones is sometimes used as a measure of maturity.

At birth the head measures approximately one-fourth the total body length, while in the adult it measures about one-eighth. The head reaches almost maximum size by middle childhood. In the new-born infant the muscles of the head and trunk comprise about 40 per cent of the total volume of muscular tissue. In the adult the percentage is from 20 to 30 per cent. The lower limbs in the new-born infant make up about 40 per cent of the weight, but by adult life this has increased to about 55 per cent.

The sense organs are relatively well developed at birth. They increase rapidly in sensitivity after birth, gradually slowing down in the early school years as these organs approach their maturity. The glands, both duct and ductless, are all present and most of them are functioning actively at the time of birth. The endocrine glands effect the development of each other. The thymus develops rapidly, and is at its largest a year or more before puberty. The gonads, on the other hand, do not develop rapidly until about the time of puberty. At present it seems probable that an important function of the thymus gland is that of acting as a check upon the development of the gonads and the secondary sex characteristics.

It should be evident by this time that there is no single rate of maturation. Instead, there are many rates of growth, nor are these rates uniform. For the particular function of each organ there is usually an early period of very rapid growth followed

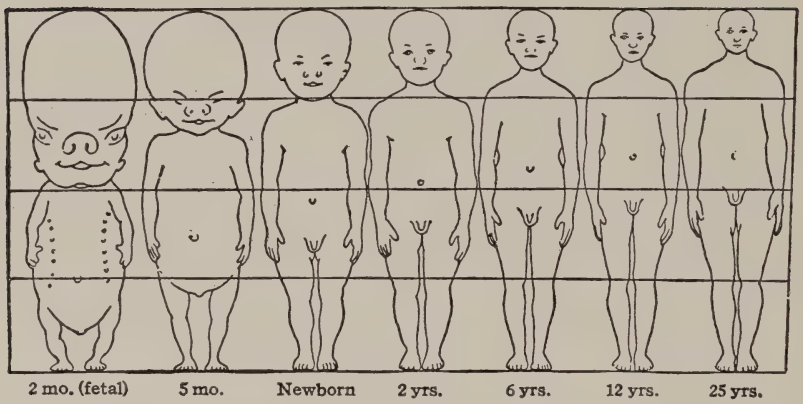

Figure 3a. Figures Representing the Changes During Prenatal and Postnatal Growth

(From Morris, *Morris's Human Anatomy*. Copyright P. Blakiston's Son & Co., Inc., Publishers)

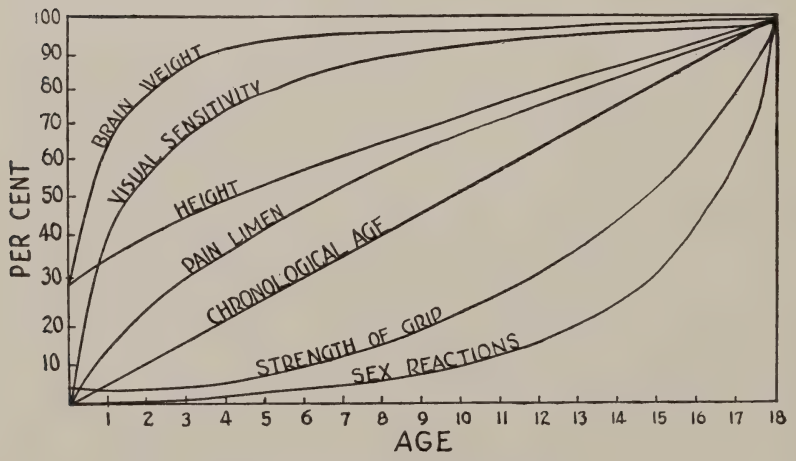

Figure 3b. Various Curves of Growth

(Modified from Gates, *Psychology for Students of Education*, The Macmillan Co., 1930)

by one of diminished rate. Maturity in one respect does not necessarily imply similar maturity in other respects. This is a fact that parents and teachers are very likely to overlook.

Figure 3 will indicate in graphic form some of the characteristics of maturation which have just been presented. Notice that by the late teen age nearly all the functions included in this figure are shown to be practically mature, but that not all of them have reached maturity at the same rate.

In recent years several cases of *puberty praecox* (unusually early reproductive maturity) have been reported for both sexes.[2] In these cases the secondary sex characteristics have also appeared. Size and strength are greatly in excess of the average for the child's age. Interestingly enough, the growth of mental function is apparently not affected, indicating that the latter depends upon factors which are not specifically influenced by those that control the factors of gross bodily maturation. Such cases as these support the view that maturation is of two somewhat distinct sorts.

The processes of maturation, viewed as a whole, can be seen in the change from month to month and year to year, even though the specific changes may not be individually apparent. It is significant, however, to consider how these changes in structural development are involved in the gradually changing behavior of the child as he grows older.

Functional Neural Maturation.—There are only two avenues of approach to the study of neural function. One of these is comparison of the brain and nervous tissues of individuals after death, the brains being chosen from those whose death arrested development at different ages. The other is the drawing of inferences relative to brain development as related to the increasing complexity of the behavior of the individual. The latter will be discussed in some detail, with many illustrations, later in this chapter. Consideration will first be given to neurological structure.

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[2] Arnold Gesell, "Precocious Puberty and Mental Maturation," *Twenty-Seventh Yearbook of National Society for the Study of Education,* Part I, Ch. 19, pp. 399–409.

At birth the frontal lobes of the cerebral hemispheres are relatively the least developed part of the infant's brain. These areas have to do mostly with motor control. The parts of these frontal lobes, whose functions are not definitely known, are believed to be made up largely of motor association tracts and areas. This would seem to explain the relatively low order of motor coordination of the infant at birth, since the muscular and skeletal development is relatively complete as compared to the development of the frontal lobes. The rate of growth of these frontal lobes is proportionately greater than that of the rest of the brain during infancy and early childhood.

The whole brain grows very rapidly in size and weight during the first few years of life. By the age of two, the brain is about 70 to 75 per cent of its adult weight. By four, this percentage is almost 90. This increase in size may or may not indicate a corresponding increase in the ability of the brain to function in a mature manner. Certainly, this rapid growth would seem to explain some of the increase in neural function. This question, however, cannot be completely answered by any known procedure and only in part by a study of the microscopic structure of the brain from stage to stage of development.

It is known that, as the child grows older, the neural fibers of the nervous system became enveloped in a sheath of substance which has an important relation to the function of the neurons. For example, the optic nerve increases rapidly in size immediately after birth and is practically full grown by the end of the first year. Much of this increase in size is due to the addition of this sheath to the nerve fibers. This change is particularly rapid in the first few weeks of life and probably accounts for the high degree of maturation of visual behavior in early infancy.

By the third or fourth month of fœtal life, the number of cells in the cerebral cortex is as great as it ever will be. Consequently, any growth changes that take place beyond that time do not result from an increase in the number of cells. Instead, the changes are concerned chiefly either with size or shape, or with the number and structure of the fibers which develop as a part of the cells. At birth many of the cells of the cortex when examined under

the microscope are imperfect and immature. As the child grows older, changes occur in the cell bodies of these cortical neurons and more especially in the nerve fibers related to them.

These facts have been further substantiated by microscopic studies of tissue from the brains of adults whose intelligence during life has been known. Such studies have shown that certain kinds of low-grade feeble-mindedness are accompanied by only rudimentary development of certain brain cells. Maturation, therefore, apparently involves minute changes in the internal structure. These microscopic changes, however minute they may be, seem to have great significance in determining the kind of behavior of which the person is capable.[3]

Care must be taken to recognize that some changes in brain tissue are probably the result of learning. In spite of this, there seem to be sound reasons for attributing much of the increased maturation of behavior to changes which continue beyond the point of rapid brain growth. Since the changes due to maturation and those due to learning go on simultaneously, one cannot be sure about the relative proportions of each.

Changes in Overt Behavior Showing Maturation.—Gesell has studied the development of infants and young children very extensively. Much of the following is summarized from accounts of his observations.[4] Gesell distinguishes four types of responses, two of which, motor responses and vocal responses, will be traced here through the early years of childhood. It is not implied that the sequence of appearance of the following series of complex responses is solely the result of maturation. The influence of learning is, of course, important, but in the responses considered here it may be assumed that all infants have approximately equal opportunities to learn, and that the differences in age at which the several levels of response make their appearance are due primarily to the degree of maturation present.

1. Motor Development as an Index of Maturity. Infantile behavior cannot be described in words. Nothing short of

[3] See Figure 4, Chapter 8.

[4] Arnold Gesell, *The Mental Growth of the Pre-School Child*, New York, The Macmillan Co., 1925.

actual observation of the child or of a motion picture of his behavior will do the child justice or show the differences in the behavior of different infants.

At birth the child shows relatively little in the way of postural or motor activity of a coordinated type. The term "random movement" best describes much of the activity observed. Fairly well-coordinated arm and leg movements do appear within the first few days and coordinated eye movements are established very early. Rhythmical sucking movements of the lips usually appear within 24 hours, so that the nursing response is established without much difficulty within a short time thereafter. But on the whole, the infant manifests only a limited type of observable coordinated movement. The internal activities which are innervated through the autonomic nervous system are apparently much more matured at birth than are those depending directly upon the central nervous system.

Yawning, sneezing, and crying are all well developed within a very short time after birth. The hands may be thrust into the mouth even within the first few hours of life. The head moves from side to side. When the palm of the hand comes in contact with a rod or the finger of an adult, the infant's fingers and thumb close in a tight grip that may on occasion be strong enough to support the child's whole weight for several seconds. When placed on its face and abdomen, the infant's legs may be flexed in such a way that they suggest crawling movements, but the head cannot be raised from the supporting surface. Within a month much change takes place. Gesell says of this period of development: "The rate of growth during the first week of life, if we could measure it, doubtless far exceeds that of any comparable interval of growth in later infancy." [5] The statement would probably have been true of an even longer period of time.

At the four-month level the normal infant holds his head erect and the neck muscles will resist pressure from either side of the head. Most infants of this age, when laid on their backs, will make an effort to sit up, and a few can succeed with some support.

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[5] *Ibid.*, p. 198.

When laid on the stomach, the infant raises his head from the supporting surface. In this position, too, there are usually some squirming, wriggling movements indicative of the creeping responses that will develop more fully later. When the infant is held in an upright position with the feet touching the floor or table, there are often thrusting movements with the feet. The beginning of the thumb opposition can be noted, and many infants at this age can pick up an inch cube when placed within reach on a table before them. In the bath, most four-months-old infants show kicking responses and some hand splashing, though the splashing lags behind the kicking.

We are concerned with many of the same responses in the behavior of infants six months old, but greatly different degrees of nicety and completeness of the responses are evident. The majority of infants at this age can sit up with only slight support, a few can sit alone, and a few can creep or hitch themselves along the floor. At this age more infants can pick up a cube than at four months, but still not all can do this. Some will hold a cube in each hand temporarily without dropping them and a very few will accept a third after dropping one of those already held. In reaching for objects, the six-months-old infant tends to employ the whole body, activity of the head and mouth as well as that of the hands entering into the response. When a small pellet is placed on the table before the infant, he ordinarily disregards it, but if he does secure it, it is done with a sort of palm scoop. It is rare for the infant of this age to use precise thumb and finger prehension. Only a few six-months-old infants show a definite tendency to throw, cast, or brush an object aside. Splashing with the hands in the bath, however, is common by this age.

By the age of twelve months, many of the responses which showed differences before are well established for all infants, making it necessary to observe new types of coordinated behavior. At this age, nearly all can stand with some help, a smaller number can stand alone, and most of them can make stepping movements. Some can walk with help, a few can walk alone, nearly all can creep, and many can climb at this age. Most of these infants will now take a third cube without dropping

either of the other two, and nearly all will secure the pellet from the table with fine prehension. A preference for one hand with inhibition of the other is well developed. When given a piece of paper, a large crayon, and a demonstration of scribbling, two-thirds of all one-year-old infants will imitate the scribbling. Only occasionally does scribbling take place spontaneously.

The motor behavior of the two-year-old child is found to be significantly more complex and more coordinated. Most of the previously noted responses no longer show many differences, since all have been well developed during the ensuing year. The two-year-old can seldom succeed in copying a circle or in imitatively making a bold horizontal line, but he is somewhat more likely to succeed with a similar vertical line. Children of this age will usually be able, upon command, to secure a small shot from a saucer and place it in a narrow-necked bottle, and then to remove it in imitation of the response of an adult. This shows a considerable advance in muscular coordination.

At the four-year-old level nearly all children can copy a circle, nearly as many can copy a cross, but few can copy a square or a triangle. Two-thirds of them can trace a diamond and some can trace a cross. The drawings of four-year-old children show a considerable degree of muscular coordination which continues to improve through succeeding years. From this time on, however, the improvement in motor responses becomes more difficult to distinguish from other elements in the total response. Thus, normal four- to six-year-old children are not highly successful in drawing a picture of a house or of a man, but this seems more a matter of lack of perception of significant elements than of the muscular coordination necessary for fairly good drawing.

Improvement in motor response as a result of maturation need not be traced beyond this point. Primary school teachers generally recognize the necessity of employing movements involving the large muscle groups instead of the smaller ones. In a well-equipped kindergarten the building blocks are of the size of bricks and larger, though light in weight. In most homes where parents do not understand the significance of immature muscular coordi-

nation, children of the same age are expected to play and build with blocks often as small as an inch on each side.

2. Language Development as an Index of Maturity. Among the first evidences of life is the birth cry. This has been variously interpreted by philosophers, but the meaning to the infant is beside the point here. Within a few weeks this response has been so differentiated as to enable the mother to recognize frequently what she calls a hunger cry, a pain cry, an anger or rage cry, and several others.

In addition to the response called crying, there are some few lip and respiration sounds which appear shortly after birth. These, together with the vocal sounds of crying, form the basis of what later become language responses. At the age of six months these have been multiplied extensively. Gesell [6] reports an accurate and detailed observation of one six-months-old infant by Malmberg. Seventy-five different sounds and combinations of sounds were used by this infant during a 24-hour period. He estimated that about 3 per cent of the waking time of this infant was employed in vocal activity. Three months later this percentage had more than doubled. Many of the sounds are probably quite unpronounceable to the adult. It is significant to note that in the progress of learning to use language, the child first learns to repeat what he hears himself say. This auto-imitation undoubtedly precedes the imitation of sounds heard from others.

By the time the child is a year old, he can, on the average, use four or five words singly. The most frequently occurring words are *dada* and *mama* followed in frequency by terms of greeting and farewell. As early as nine months of age one commonly finds the ability to make adjustments to some words spoken by others. Comprehension is evidenced by the behavior of the infant even before the child can use words in its own response. By eighteen months of age the child is using two or more words together, and a few can point to objects in a picture or name them when pointed to by others.

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[6] *Ibid.*, p. 216.

By two years of age, the child is using simple sentences, can name familiar objects, and can obey commands involving prepositions such as *in*, *on*, *under*, or *behind*, but rarely uses pronouns or plurals. Most children two years of age can point to familiar-named objects or name familiar objects pointed to in pictures. A few at this age can repeat three or four syllables after hearing them once.

By four years of age infantile inaccuracies of articulation are pretty much a thing of the past. The average child of this age can repeat ten or twelve syllables from memory after a single oral stimulation. A very few can repeat five digits, but most can repeat only four. Most children can use descriptive words or phrases by this age, and somewhat fewer can define by use such common objects as chair, house, and doll.

The spontaneously spoken vocabulary of the child increases greatly from four or five words at the age of one year, to several hundred or a thousand by the age of six. A number of studies have been made of the vocabularies of children, and in general they agree. They show a remarkably rapid increase during the years from one to six or eight.

Other Ways in Which Maturation May Be Shown.—Two different types of responses have been shown to become progressively more complex as the individual becomes more mature. The implication is that the greater complexity of response is causally related to greater general maturation of the structure of the child as he grows older. This seems reasonable in terms of the particular responses which have just been examined. Other types of responses might have been used in addition to the ones employed here. Gesell has stressed the increasing complexity of the child's adaptive behavior and the similar increase of complexity in his personal-social responses as he becomes more and more mature.

There are, of course, wide ranges of difference in the general rates at which individuals mature. These, like differences in intelligence, which will be considered in detail in the next chapter, seem definitely to be dependent upon inherited potentialities.

Other differences relate to more specific behavior patterns and presumably may be more the result of differences in environment. Hence, it is evident that learning as well as maturation is of great importance in modifying the behavior of the individual.

Some of the ways in which maturation is made evident in the early years of childhood have been pointed out, because, during these early years the rate of increase in maturity is relatively great enough to permit of careful examination and analysis. It is characteristic of most of the phases of maturation that the rate of development becomes progressively slower. Consequently, if an attempt is made to note the differences in levels of maturity beyond the early years of childhood, confusion results because of the relatively small increases from month to month and year to year. The confusion is made greater by the fact that changes due to experience have by this time accumulated to the point where learning tends to obscure the process of maturation.

An Outline Summary

1. Maturation as a factor in behavior.
   - A. Maturation is difficult to study because:
     - (a) From birth learning and maturation proceed simultaneously,
     - (b) Social objections make possible only a limited type of experimentation with human infants, and
     - (c) Experiments with lower animals give evidence that is only partially applicable to human behavior.
   - B. Several kinds of experiments revealing the significance of maturation have been employed, including:
     - (a) Controlled experiments with young animals, such as chicks, birds, rats, and apes, and
     - (b) A few controlled experiments of a limited nature with identical twins.
2. Nature of changes during maturation.
   - A. Such changes fall into two categories:
     - (a) Gross structural maturation involving chiefly changes in relative and absolute size and shape of organs.

(b) Functional maturation probably involving for the most part minute changes in the structure of the nervous system and is concerned with muscular coordination and integration of behavior.

B. Differences in rates of maturation are of two general kinds:

(a) Maturation generally tends to show a progressive slowing down as age increases, and

(b) Different organs have rates of growth and different ages of final maximum maturity.

3. Kinds of overt behavior that indicate degrees of maturity.

A. Motor development as shown by postural control and several other kinds of muscular coordination and integration.

B. Language development as shown by the mastery of vocal responses and the employment of language symbols.

C. Other types, such as adaptive behavior and personal-social responses.

4. The relationship of the effects of maturation and experience.

A. The appearance of a behavior pattern is impossible before a minimum degree of maturity is attained.

B. The effect of experience upon behavior depends upon the degree of maturity attained.

C. No amount of experience before the attainment of the necessary minimum of maturity has any great or permanent effect upon the individual's behavior. Increased maturity after this minimum of maturity has been reached tends to lessen the amount of learning necessary to produce a given degree of improvement.

Problems for Further Thought

1. Observe, for at least half an hour each, children of the ages of six months, one year, and two years. Compare the motor behavior of these on the basis of the material in this chapter, summarized from Gesell.

2. Make a list of presents that would be suitable for a niece or nephew at the following ages, paying no attention to the matter of cost, but emphasizing the matter of their appropriateness to the maturity of the child's age: (a) three years; (b) five years; (c) eight years; (d) twelve years; (e) seventeen years.

3. What is the chief source of difficulty in discriminating between the results of innately determined maturation and those of learning?

4. This chapter has emphasized the fact that the whole program of maturation of behavior evidently follows a pattern of regularity that is similar for all children. What is the most significant practical value of these facts?

5. A child is reported to have cut only two teeth at one year of age. At that age he began to creep. He did not walk until twenty months of age, although body size was near normal. The Babinski reflex was still present at nine months of age. He was able to follow with his eyes an object moving slowly before his face in a horizontal direction for the first time at about four months of age. At his present age of two years he can say a few words but does not make even short sentences.

(a) What sort of development rate does this picture present?
(b) What will be the most probable state of his development (i.e., retarded, average, or advanced) when he is four years of age; at eight years of age; at the end of adolescence?

6. A teacher of seventh grade pupils in a school on the prairies of eastern Colorado complained that she could not make her pupils appreciate a poem which was included in the course of study. It was "The Chambered Nautilus," by Holmes. The chief objects described are the sea and the sea shell. The theme of the poem is suggested by the line, "Build thee more stately mansions, oh my soul!" What objection might appropriately be raised against the use of this poem under the circumstances, aside from the unfamiliarity of these children with things pertaining to the sea?

Another poem that is often included in elementary readers is Whittier's "Barefoot Boy" on the ground that it is about a small boy. In reality it is a poem of retrospective reflections and the envious wish of a man to be a boy again. Does the same objection apply to this poem's use in elementary school as to the "Chambered Nautilus"?

Suggested Readings

Gesell, Arnold. Infancy and Human Growth. New York, The Macmillan Co., 1928. Ch. VII, "The Tempo and Trend of Infant Development," pp. 136–163. Note particularly p. 143 ff.

GESELL, ARNOLD. The Mental Growth of the Pre-School Child. New York, The Macmillan Co., 1925. Ch. II, "The Significance of Pre-School Development," pp. 9–14; Ch. III; "Development and Duration," pp. 15–23; Ch. IV, "The Scientific Study of Development," pp. 24–36.

GESELL, ARNOLD, and THOMPSON, HELEN. Infant Behavior, Its Genesis and Growth. New York, McGraw-Hill Book Co., Inc., 1934. Ch. V, "Mental Growth and Maturation," pp. 293–322.

GESELL, ARNOLD. "Learning and Growth," Genetic Psychology Monographs. Worcester, Mass., Clark University Press, 1929, No. 1.

HOLLINGWORTH, H. L. Mental Growth and Decline. New York, D. Appleton-Century Co., 1927. Ch. II, "The Nature of Development," pp. 8–16; Ch. III, "General Features of Development," pp. 17–32; Ch. IV, "Stages of Human Growth," pp. 34–48. Several other chapters will also be of interest dealing with the several stages of growth.

JORDAN, A. M. Educational Psychology. New York, Henry Holt & Co., 1928. Look in index under "maturity" and "reading interest."

KELLOGG, W. N. and L. A. The Ape and the Child. New York, McGraw-Hill Book Co., Inc., 1933. Look in index under "maturity."

Chapter 8

WHAT IS INTELLIGENCE?—HOW CAN IT BE OBSERVED AND MEASURED?

It is appropriate at this point to consider the topic of intelligence, since it very nicely illustrates a special phase of general maturation, and because problems pertaining to intelligence are themselves of great importance.

Intelligence as an Abstract Quality.—Intelligence, as it is usually defined in psychology, is one of the most debated issues in that field. Everyone thinks that he or she knows what an intelligent person is. Why should psychologists have so much trouble in discovering and measuring intelligence? What the psychologist has done often seems such a long, roundabout way of defining and measuring that which is fairly well known to everybody.

Many psychologists have tried to discover a means of measuring intelligence, but Binet was the first to arrive at a satisfactory method of attacking the problem. Instead of looking for the *intelligence* of an individual, he began to look for indications of *intelligent behavior*. Instead of regarding intelligence as a thing, Binet advanced the idea that it was a way of behaving. He was not concerned with finding a single mental trait or faculty of the mind. He began to observe the behavior of individuals who were known to be feeble-minded and to compare this behavior with that of persons of the same age and with approximately the same experience who were known not to be feeble-minded. He was looking for evidences of intelligent behavior as distinguished from unintelligent behavior. In other words, he regarded intelligence as a characteristic of behavior comparable, as an abstraction, to such qualities as goodness or honesty. It was something that existed only as an abstract quality.

What Are the Characteristics of Intelligent Behavior?—Before the measurement of intelligence can be discussed it is necessary to answer the question: What are the characteristics of intelligent behavior? Psychologists' attempts to answer this question do not show perfect agreement in all particulars, but there are some general aspects about which there is a fair accord.

To begin with, intelligent behavior does not follow a fixed and unvarying pattern. What might be intelligent behavior in one total situation might not be such an intelligent way of behaving in another. The way in which an eight-year-old boy manipulates a simple problem situation might give evidence that he was of average brightness, but if a twelve-year-old boy responded to the same problem situation in the same manner it might be a reasonable cause for suspecting that the child was of low intelligence. Nevertheless, no matter what the age of the person may be, there are certain characteristics of intelligence which manifest themselves in increasingly greater degree with increasing maturity.

One of these characteristics is the ability to center one's attention on a particular task or problem until success is achieved or proves to be impossible. Another is the ability to analyze and discover significant elements in the problem situation. A third is the ability to disregard insignificant elements and relationships. Still another is modifiability. The unintelligent person, using an unprofitable method, keeps on doing a thing in the same way over and over again, while the intelligent person in the same situation discovers a more economical way of accomplishing the same end. Observation of this characteristic type of behavior has sometimes caused intelligence to be defined as the capacity to learn. The capacity to learn is, indeed, an important factor, but at the higher levels of maturity the most important characteristic of intelligence is the ability to utilize abstract ideas. The intelligent individual is capable of utilizing ideas obtained from previous experiences even in the complete absence of the physical facts of that experience.

As one watches a group of persons of about the same age and experience solving mechanical puzzles, it will soon be evident

that some fix their attention very definitely on the problem itself and continue to do so over relatively long periods of time. Others soon find their attention distracted, and begin to respond to things which have no bearing upon the problem at all. This indicates, as characteristic of intelligence, not only the fixing of attention upon a problem, but also the ability to disregard non-pertinent elements in the whole situation.

It will also be observed that some continue doing the same thing over and over again with a sort of random manipulation of the parts of the puzzle. Eventually they may stumble on the solution, in which case they will probably be surprised at the results. On the other hand, some, having tried a particular manipulation once or twice, discover that it is not successful, and thereafter, avoiding repetition of this useless procedure, seek to discover other manipulations. When they finally arrive at the solution, they have an understanding of the relationships involved and can reproduce the solution more or less at will. Finally, in this mechanical puzzle situation it will be evident that some persons are continually manipulating the parts, while others move them very little. When asked what they are doing, some, at least, will be able to describe some part of their behavior in terms of ideas. In fact, some will be found who have examined the puzzle and have laid it to one side to "think out" the solution without more manipulation of the different parts.

Of course, it should not be inferred from this illustration that mechanical puzzles are the only means of estimating intelligence. It is characteristic of all intelligence tests since the time of Binet that a complete test consists of a number of samples of different kinds of situations from the individual's life experiences. No reliable measurement or estimate of intelligence can be made on the basis of a person's reaction to a single situation.

Basis of Intelligent Behavior.—Intelligent behavior, like behavior in general, is dependent upon the inheritance of the individual. The structure most significantly involved seems to be the nervous system, particularly the cerebral hemispheres. It is not known in detail exactly which elements of brain structure dis-

tinguish the feeble-minded person from the normal or superior ones. Studies have been made which seem to show decided structural differences in the cerebral cortex of the low-grade feeble-

Figure 4. Structural Differences in the Cerebral Cortex of a Feeble-Minded Person Contrasted with the Corresponding Part of a Normal Individual
(Herbert Woodrow, *Brightness and Dullness in Children*, Philadelphia, J. B. Lippincott Co., 1919, Fig. 5, p. 76)

minded person when contrasted with the corresponding part of the cortex of the normal individual. Figure 4 shows the differences in the structures as shown in these studies. It should be noted, however, that as yet little is understood about the struc-

tural differences of the brain as related to differences in intelligence.

Environment, too, is important in the understanding of intelligent behavior, for only through environmental factors can behavior be made evident. The degree to which any behavior is intelligent can be judged only in terms of how well this behavior adjusts the individual to his own environment. Let this point be very clear. It is not the environment that makes one intelligent; rather it is the nature of one's responses to the environment that calls forth such degree of intelligence as one possesses.

By any kind of a measure the late Thomas A. Edison would be regarded as an intelligent man because of what he accomplished in the environment of a modern world. Suppose that, with exactly the same inherited structure, he had been born in feudal times. It is improbable that under feudal conditions of life he would have invented electric lights and the phonograph. But it is altogether probable that he would have been a superior individual in terms of the craftsmanship of his times and of the demands made upon his inventive genius by the environmental conditions of that day. Or suppose that Leonardo da Vinci had been born in the twentieth century. He might not have painted the particular pictures that have come from his brush and he might not have been interested in the particular kinds of mechanical inventions that have been credited to him. However, it would be safe to say that, whatever the time or the country in which he had found himself, he would most certainly have been regarded as an exceedingly intelligent man.

It should be clear, therefore, that intelligence is concerned with the manner of behavior rather than with the particular thing that is done. How intelligently one behaves, i.e., how successfully one adjusts to his environment, depends very largely upon the structural conditions of the bodily mechanism. The limiting capacities of bodily mechanism are presumably inherited; at least they depend upon inheritance as an important factor.

Intelligence as a *capacity to learn* or as an *aptitude for adjustment* must be carefully distinguished from *what one learns* or *which particular adjustment one makes.* Herein lies the reason

for much of the confusion experienced by many persons in approaching the question of whether present-day intelligence tests really measure intelligence. Since the time of Binet and, more particularly, since the use of intelligence tests has become widespread, many have argued that these tests could not possibly be regarded as measures of intelligence in the generally accepted sense of the word. They have asked, for example: How could it possibly be true that the ability to repeat a sentence or to count thirteen pennies could be considered a measure of a child's intelligence? These critics have failed to recognize the difference between what one learns and the aptitude or capacity for learning. The only known way in which to determine a person's capacity to learn is to compare his behavior with the behavior of those who have had similar experiences.

Tests of Intelligence Are Really Aptitude Tests.—The term "intelligence test" is unfortunate. It implies to most persons something about which they are inclined to be "touchy." One ordinarily runs no risk of offense in telling a man that his boy is a bit below average in height. One may even flatter a woman by saying that she is a bit below average in weight, although the fashion in that respect seems to be changing. But suggest to either a man or a woman that his or her children are a bit below average in intelligence, and things will take a different turn.

Intelligence tests are tests of a rather undefined kind of aptitude. As most of them are now constructed, they attempt to measure aptitude for dealing with abstract language situations. Their results are of genuine significance when properly used. They are extremely useful for predicting success in situations that involve a high degree of general abstract language ability, but they must not be thought of as complete measures of all kinds of aptitudes. They are not to be regarded as of more than incidental value in the matter of predicting vocational aptitude and no properly trained psychologist would make such claims for them. It is only the partially trained or untrained "tester," whose enthusiasm regarding the use of these tests is probably his greatest professional vice, who will make these extravagant claims.

ADMINISTERING AND INTERPRETING INTELLIGENCE TESTS
REQUIRES MUCH TRAINING AND EXPERIENCE

Intelligence tests are made up of samples of problem situations. They are based upon the assumption that the capacity to learn can be measured by what one has learned, or that aptitude for adjustment can be determined by the adjustments which one can make in the test situation. But the responses of those tested must be properly evaluated. For example, there is nothing about the ability to count thirteen pennies that makes a child four years of age seem to have normal intelligence. The significance of such a performance lies in the fact that the average four-year-old child can do this, while most three-year-old children fail to do it. Stated in still another way, no measures employed in an intelligence test have any significance in themselves. Whatever significance they have comes entirely from a comparison of the responses of various persons who have been measured in the same test situation.

A further condition of the value of these tests as measures of intelligence must be made clear. Binet very early recognized that the problem situations to be included in a test should be those with which all the participants had had approximately equal experience. Every good intelligence test therefore includes only test situations which are drawn from experiences equally familiar to all who might be measured by the tests.

Interpreting Intelligence Test Scores.—Two concepts which are frequently employed in evaluating and interpreting the results of intelligence tests are "mental age" and "intelligence quotient." Considerable confusion often arises from the use of these terms, due apparently to lack of understanding of the meaning and limitations of each.

By mental age is meant the degree of maturity of mental function that is evidenced by the person tested. It is expressed numerically as the average of the ages of all those who have a similar degree of mental maturity. It indicates *how much* the individual has matured mentally, but in itself it furnishes no information at all as to *how rapidly* the growth is taking place. Thus, to say that a person has a mental age of eight years does not indicate whether the person is a very bright child of five or a feeble-minded adult.

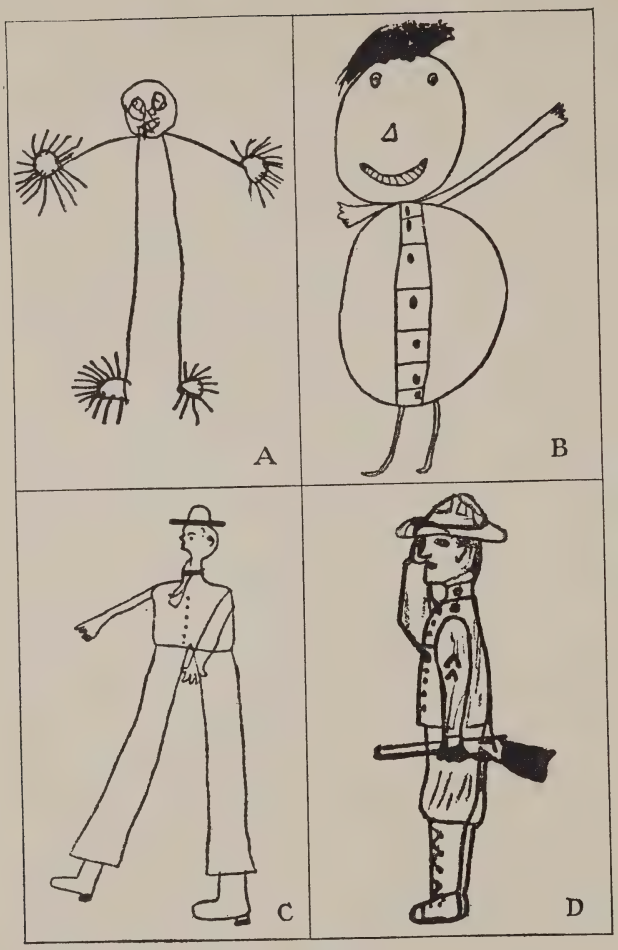
The intelligence quotient (I.Q.), on the other hand, is a device for indicating *how rapidly* the individual is maturing mentally, but in itself it does not indicate *how much* growth has already occurred. It is obtained by dividing the mental age by the chronological age and multiplying by 100 to avoid dealing with a decimal fraction. It should not be thought of as a kind of percentage, since the units of mental age are not constant for the entire chronological range of development. The intelligence quotient obtained for a person whose mental age and chronological age are the same would, of course, be 100, and since such is the case with the average person, an I.Q. of 100 is said to be average. The same result is obtained if the intelligence quotients of a very large number of randomly selected persons are averaged. It is customary to interpret intelligence quotients approximately as:

I.Q. below 20	Idiots
I.Q. from 20–50	Imbeciles
I.Q. from 50–70	Morons
I.Q. from 70–80	Borderline deficiency
I.Q. from 80–90	Dull
I.Q. from 90–110	Normal
I.Q. from 110–120	Superior
I.Q. from 120–140	Very superior
I.Q. from 140 & above	"Near" genius or genius

It should not be imagined, however, that sharply defined dividing lines distinguish one classification from another. The divisions are merely means of convenient definition that correspond to common-sense observations.

Mental maturity is reached relatively early in life, probably by middle adolescence for the average person. Hence, the concept of the intelligence quotient *loses its meaning* if applied to persons who have gone beyond the point where one's mental age reaches its maximum. In order to distinguish degrees of mental level in those older than the high school age, it is therefore necessary to employ other devices.

Among such devices, the one most frequently used is the percentile scale. Percentile norms are computed from large groups of scores by determining which scores in the group are equalled or surpassed by each percentile point from 1 to 99. Thus, a per-



CHILDREN'S DRAWINGS

Can you tell how old these four children are mentally? All have intelligence quotients that are near average. After you have made your estimates, turn to the footnote on page 166. (From Florence Goodenough's *Measurement of Intelligence by Drawings*. Copyright 1926 by World Book Co., Yonkers-on-Hudson, New York.)

centile score of 25, 50, or 80 would indicate that the person having such a score was as good or better than 25, 50, or 80 per cent, respectively, of the group used for determining the norm.

Most tests of intelligence commonly employed by college personnel departments use scores which are reported in terms of percentiles. The American Council Psychological Examination bases its percentile scores upon the scores of a large number of college freshmen from several types of colleges in different parts of the United States. Suppose, then, that a certain freshman makes a percentile score of 25 on this test. Just what does such a score mean? Principally, it means that this person has made a score as good as 25 per cent of the large test group of heterogeneous college freshmen.

The question is then frequently asked: What degree of intelligence would such a percentile score represent, if expressed in terms of I.Q.? In the light of the foregoing discussion, it will be seen that there is no satisfactory answer to this question, since college freshmen have gone beyond the age where the intelligence quotient is significant. School progress is a highly selective process. The further the group proceeds through the grades and classes, the greater is the likelihood that those with lower levels of mental ability will drop out. As a result, each succeeding higher level of school is attended by an increasingly select group. It is at present impossible to determine which level of the original unselected group that began school in the first elementary grade is represented by the average at the college freshman level. But it must be apparent that the average college freshman is much above the middle level of the general population. All college freshmen are graduates of high school before the selective process of college entrance begins. Probably persons who are very much below the average of intelligence of the whole population do not graduate from high school. Hence the college freshman with a 25 percentile score on the college entrance test is undoubtedly above the general population average.

Relationship of Intelligence to Anatomical and Physiological Traits.—There is a common but false belief that persons who are particularly well endowed with intelligence are for that reason

especially prone to have poor health or to be lacking in good looks, or to have certain traits that are not socially desirable. This has probably grown out of the wishful thinking of persons who are not particularly gifted with intelligence. They try to compensate for their feeling of deficiency by pointing out that they are not socially lacking in other traits. Such a belief has no justification in terms of the evidence now available.

Terman and his assistants made a very intensive study of a number of traits of about a thousand children with very superior intellects. The findings show that, as a group, these children were also distinctly better than average in such traits as health, freedom from physical defects, height, and weight.[1] Similar results have been shown by others who have made special studies of gifted children.

On the other hand, many students and observers of feeble-minded children have been impressed by the socially undesirable traits that appear in such a group. Feeble-minded children, as a group, are below the average of normal children in height and weight. They are distinctly below the average in social development. Compared with groups of near-average individuals, these feeble-minded persons are much more frequently ill, and physical defects are decidedly more numerous among them. In fact, among the very low-grade feeble-minded, marked physical abnormalities are very common.

Despite these observations, it is not at all safe to depend upon physical traits as indicators of intelligence. A high forehead is still wrongly believed to be indicative of a high degree of intelligence. Instead, it may be only an indication of rickets in childhood. In the same way the size of the head and the distance between the eyes are only fanciful indications of the degree of intelligence. One group of idiots is called *macrocephalic.* Literally, this means giant-headed idiots. At the other extreme are

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[1] L. M. Terman, *et al., Genetic Studies of Genius,* Vol. 1, Stanford Univ. Press, 1925.

Drawings on page 164.

Drawing	*M.A.*	*C.A.*	*I.Q.*	*Sex*
A	5-0	5-4	94	Girl
B	7-3	7-4	99	Boy
C	9-9	9-7	103	Boy
D	13-3	12-9	104	Boy

TWO TYPES OF MENTAL DEFECTIVES

How much does extreme head size indicate the level of intelligence?

the "pin heads," the *microcephalic* idiots. Numerous studies have been made of the weight of the brains of individuals whose intelligence in life has been fairly well known. Very large brains, as well as very small ones, have been possessed by individuals of almost every level of intelligence.

Similarly numerous studies have been made to discover the relationship between general physical appearance and intelligence. In some cases the observations were made of the persons themselves, while in other cases photographs were used. In no case has it been shown that even the most experienced judges of intelligence are able to judge with any accuracy either high or low intelligence. But when these same persons have been observed *while they were behaving,* somewhat better results have been obtained. In other words, when the behavior itself is examined, more reliable evidence of intelligence is obtained than is the case when only the anatomical features are employed as a basis of judgment.

Relationship of Intelligence to Other Behavior Traits.—A problem that is of particular interest to social workers is the relationship of intelligence to delinquency. A mass of evidence has been accumulated over a period of years, but not all of it has been well interpreted. It is doubtless true that the average intelligence of juvenile delinquents is below that of the average of school children of the same age. However, one may easily be misled by such evidence. Many investigators have interpreted their data to imply that there is a special tendency for the individual of low-grade intelligence to be antisocial. But it does not necessarily follow that the facts establish a close cause and effect relationship. Certainly, there are large numbers of children of low intelligence who do not show antisocial behavior, while large numbers of intellectually superior children are antisocial.

Children of low intelligence are most frequently found in homes of the lower social and economic levels, and in such cases the low intelligence is in large part due to the inheritance of a low general aptitude level. The relatively poor social and economic features of their environment might also be expected to be re-

flected in their somewhat greater tendency toward antisocial behavior. Of course, this antisocial tendency does not extend to all individuals, either parents or children, nor is it confined to the lower ranges of intelligence.

Another significant factor in antisocial behavior can be observed in the schools. Pupils who are intellectual misfits tend to become antisocial. School children of low intelligence are unable to meet the demands made upon them, and the school and social pressures brought to bear upon such pupils are often important causes of the beginnings of antisocial behavior.

In another way, intelligence has an interesting relationship to other aspects of behavior. Since socially desirable traits tend to be positively related to each other, one might reasonably expect that financial, social, school, and political attainments would most frequently be found in those of greatest intelligence. As a matter of fact, several studies of both children and adults confirm this expectation. Thus Terman's [2] study clearly showed the superiority in school attainment and social adjustments of a group of intellectually superior children. It seems to be a case of "to him that hath shall be given, and from him that hath not shall be taken away even that which he seemeth to have."

How Does Intelligence Change During the Span of Life?— At birth the infant can make very few adjustments to his environment. Within a few days after birth he learns to cry to be picked up. By the time he is half a year old he is able to reach for objects. One of Watson's [3] experiments with such an infant shows a clear case of adjustment. The child was seated in his mother's lap. A lighted candle was held within reach. The child made several efforts to reach and grasp the candle flame. The experimenter took care that the child was not burned, but he was allowed to get his hand uncomfortably hot. When the candle was presented again, the child hesitated, then made a movement that was distinctly different from the previous reaching and grasping. This new movement was decidedly in the nature of a slapping motion.

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[2] *Ibid.*

[3] J. B. Watson, *Psychology from the Standpoint of a Behaviorist,* Philadelphia, J. B. Lippincott Co., 1924, p. 299.

Another illustration involves a child of about thirteen months of age. A bright new yellow pencil was held before him. He grasped and held it in his right hand. Another pencil was presented. He first reached for this one with his right hand while still holding the first pencil with that hand. Then he transferred the pencil to the left hand and reached for the second with the right. When a third pencil was offered, after a slight hesitation he transferred the first to his mouth, the second to his left hand, and reached for the third with his right hand. He could not go beyond holding three pencils at a time. When a fourth was offered, he dropped the one in the left hand, transferred the third one to that hand and took the new one in the right. This is clear evidence of adjustment to a fairly complex situation.

It would be interesting to trace the increasing ability to make such adjustments throughout later ages by the use of similar illustrations. However, it is only necessary to watch children of different stages of development to see that this ability gradually increases to the point where the child can adapt its responses to complex life situations. It will also be helpful to refer to the discussion of maturity in the preceding chapter.

Another characteristic of increasing ability to behave intelligently is seen in children's drawings, when artistic value is not involved.[4] Here the examiner is dealing with the ability to discover pertinent elements in a situation and the relationships between them. When a three-year-old child is given a piece of paper and a pencil and is asked to draw a man, the result is likely to be little more than a circle with some marks in it. When questioned, the child replies that the circle is the man's head and the marks in it are eyes. At a little later age the child spontaneously adds arms and legs directly to this circle representing the head. A hat may be included, often above but not on the head. Later the body is drawn, and still later the neck is represented. All this has been in terms of a front view. Finally, the profile drawings begin to appear, although at first front views and profile elements are often found in the same drawing.

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[4] F. Goodenough, *Measurement of Intelligence by Drawings,* Yonkers-on-Hudson, World Book Co., 1926.

These boys are of the same chronological age but differ widely in their intelligence quotients.

Examine the pictures carefully and rank the twelve boys pictured on this page in order of your judgment of their intelligence.

Then turn to the footnote on page 179. (By permission, from Paul Popenoe, *The Child's Heredity,* Williams & Wilkins Co., Baltimore, Md.)

Drawing a house shows similar stages of growth. At first it is little more than a rectangle. When doors and windows are added, they are frequently put on the side of the house so that they stick out from what adults take to be a side view. Only much later does the child discover the relationship involved in representing the roof and the gabled ends. Not infrequently two gabled ends are shown on opposite sides of the building. Finally, there is a fairly complete representation of the respective elements of the house, with their proper relationship indicated. This increasing insight or ability to perceive relationships and specific elements is one of the characteristics of the increase in the general aptitude called intelligence. It is manifested in terms of a great variety of adjustments and continues to increase to the maximum level of each individual's capacity. It is this increased ability to recognize relationships and to adjust to complexities that is the chief characteristic of the change in intelligence as the child matures. Later in life this tendency is reversed, resulting in the inflexibility of old age.

Relationship Between Rate and Final Level of Intelligence.—Dvorak [5] and others have demonstrated an interesting fact concerning the relationship of rate of growth of intelligence and the time in life when the high point in the curve is reached. Dvorak's study shows that those with an I.Q. at or near normal have a growth curve that follows the one represented by the middle line in Figure 5. The I.Q. remains approximately constant with increased age up to middle adolescence.

On the other hand, for persons with an I.Q. distinctly below normal, the growth curve becomes progressively flatter, and the final high point is reached earlier in life than for the normal individual. This is represented in Figure 5 by the lower line. The I.Q. of the inferior individual tends to decrease as he grows older.

For those individuals who are distinctly superior, the curve also becomes flatter as age increases; but this increasing flatness

[5] A. Dvorak, "Relation of I.Q. to the Prognosis of Special Class Pupils." *School and Society*, June 21, 1924, Vol. XIX, No. 495.

appears at a slower rate, and the final high point is reached at a later age. This is represented by the upper line in Figure 5. Here the I.Q. tends to increase with increasing age. Such individuals are not only brighter than normal, they mature more rapidly; and they actually continue to grow for a longer period

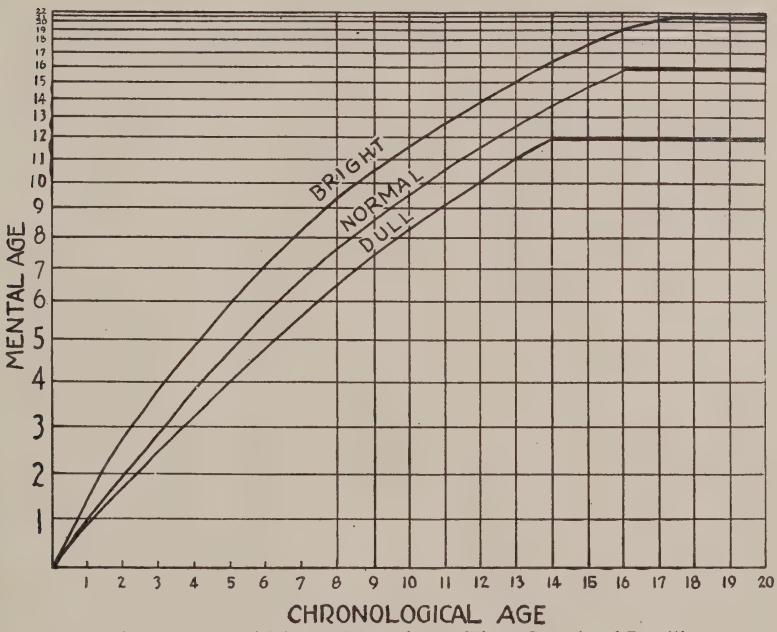

Figure 5. Progress of Mental Maturity at Three Levels of Intelligence

of time. A dull individual, on the other hand, is not only duller than the average, but seems to get duller as he gets older and reaches his maximum of intelligence relatively early in life.

The average person, considering his mental endowment as a whole, reaches approximately full capacity between the ages of fourteen and sixteen. Terman [6] in his revision of the Binet-Simon test says that sixteen is the age of mental maturity, while Pintner [7] believes it to be fourteen. Thorndike,[8] on the other

[6] L. Terman, *Measurement of Intelligence,* Boston, Houghton Mifflin Co., 1916.
[7] Rudolph Pintner, *Intelligence Testing,* New York, Henry Holt & Co., 1931.
[8] E. L. Thorndike, *Adult Learning,* New York, The Macmillan Co., 1928, Ch. XI.

hand, has evidence to show that intelligence probably continues to increase until the middle or late twenties. He suggests, however, that the increase from the middle of adolescence until maturity is at such a very slow rate that it cannot readily be measured by intelligence tests now available.

Can One's Intelligence Be Changed?—Such questions as the following are often asked, particularly about children whose I.Q.'s are below normal: "Will the child outgrow this dullness?" "Can anything be done that will increase the child's capacity for intelligent behavior?" The first of these questions has already been answered in the negative. In fact, the tendency seems to be in the opposite direction, though the decrease may not, on the average, be great.

Around the second question has raged a storm of controversy. The answer, based on several extended experiments, seems also to be in the negative, at least as far as large increases are concerned. Itard, long ago, sought to increase the capacity of the Wild Boy of Aveyron. This boy was found roaming wild in the forest and was taken by Itard into his own home. There, for several years, Itard gave him every attention and sought to show that his uncouth habits and apparent low mental capacity could be changed to a marked degree. Finally, however, he was forced to conclude that it could not be done, and that the boy was destined to remain an idiot all his life.

Society and social attitudes prevent the carrying out of experiments that would conclusively answer this question, but approximations have been attempted by Freeman [9] and others. Children who were placed for adoption were measured by intelligence tests before adoption and after having lived in the foster home for several years. The assumption is that homes that are open to the adoption of children provide an environment somewhat better, on the average, than do the homes from which these children come. In the case of children placed when very young there is

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[9] F. N. Freeman, "The Influence of Environment on the Intelligence, School Achievement, and Conduct of Foster Children," *27th Yearbook of National Society for the Study of Education,* Part I, pp. 103–218. Summary, p. 209.

some evidence of an increase in I.Q. But this increase is not large and does not appear to a noticeable degree if adoption takes place after the age of about ten years. *In no case* was there any evidence of feeble-minded children becoming normal, or of a normal child becoming distinctly superior.

It would not be fitting to end this discussion of intelligence without mentioning a point of view emphasized several years ago. Bagley [10] suggested that growth of intelligence ought to be regarded as having two dimensions. It might increase both vertically and horizontally. By the vertical development he seems to mean about whatever is measured by present-day intelligence tests. By horizontal growth he means the almost limitless amount of knowledge and number of skills and adjustments that are possible at each successive level of vertical growth.

Consider the case of a person with a mental age of eight years. He has the capacity to learn and adjust which is common to the normal eight-year-old. He cannot learn certain things that the normal ten- or twelve-year-old child can learn, nor can he make some of the adjustments of behavior characteristic of the person who is older mentally. However, there are many possibilities for new adjustments at the *eight-year* level. His development of the vertical type may stop at the mental age of eight years, but there are countless adjustments that normal eight-year-old children *can make* that many never have an opportunity to make at that age. If they do make them, it is often at a later age. This point of view seems sound enough and has the great advantage of giving hope of increased and enriched living to every person whatever his mental level may be.

An Outline Summary

1. The nature of intelligence.
   - A. Intelligence is a specific aspect of the general problem of maturation of behavior.
   - B. Intelligence is an abstraction; it does not exist as a concrete thing.

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[10] W. C. Bagley, *Determinism in Education,* Baltimore, Warwick & York, 1925, Ch. 1.

C. Intelligence is best regarded as a generalized aptitude for adaptation to new situations in terms of previous experience.

D. Some important characteristics of intelligent behavior:

(a) Ability to learn from experience.

(b) Ability to keep a problem in mind.

(c) Ability to employ a variety of approaches in solving a problem.

(d) Ability to disregard unimportant and irrelevant details in solving a problem.

(e) Ability to deal with abstract ideas.

2. The neurological basis of intelligence.

A. Is not well known but presumably depends upon complex structural characteristics of the cerebral cortex.

3. Tests of intelligence.

A. Have grown out of attempts of psychologists to obtain quantitative measures of human adaptability.

B. Are really measures of what an individual has achieved as compared with what others have achieved in situations where previous experience with the test items is closely similar.

C. Comparison with others is the basis of all interpretations of intelligence test scores:

(a) Mental age is the measure of an individual's mental maturity expressed as the average of the chronological ages of those who have developed to an equal degree.

(b) Intelligence quotients compare the rate of individual mental growth with that of the average.

(c) Percentile scores express the relative degree of mental growth in terms of the per cent of a large group who have scores which the individual equals or surpasses.

4. Intelligence as related to other traits.

A. Anatomical traits:

(a) Show too little significant relationship to intelligence to permit an estimate of intelligence from a knowledge of such traits.

(b) Some studies show a small but positive relationship between bodily development and the development of intelligence.

B. Behavior traits:

(a) Mental development shows a small positive relationship to other socially desirable behavior traits.

5. The growth curve of intelligence.

A. Rate of growth:

(a) The rate of individual growth decreases with advancing age.

(b) Compared to general averages of rate of growth, the individual's rate tends to remain constant, i.e., the dull stay dull and the bright remain bright.

(c) The final level of mental growth is inversely proportional to the rate of growth.

(d) Only extreme changes in bodily structure or in environment will produce even slight changes in the mental growth curve.

Problems for Further Thought

1. A twelve-year-old boy is in the elementary school. He is given an intelligence test from which it is determined that his mental age is ten years. In discussing this matter with the parent, which of the following lines of reasoning is justifiable? (a) The boy is feeble-minded. (b) He is dull enough to make it probable that he will have difficulty in doing school work of the usual kind at the usual rate. (c) He has an intelligence quotient of 120 and this would indicate that he should receive extra promotion. (d) He should be trained to be either a barber or an auto-mechanic. (e) He should be taken from school entirely.

In each case explain why the implied interpretation of intelligence test scores is sound or why it is not.

2. In a novel by the name of *Job,* written by Roth a few years ago, one of the characters is a feeble-minded boy who is left in Poland by the family when the others emigrated to the United States. Several years later he turns up in New York as a talented, intelligent individual. Indicate the reasons why such a plot is or is not within the realm of probability.

3. Mary is six years old this month. An intelligence test indicates that her I.Q. is 100. What will be the most probable mental age of Mary when she is ten years old?

4. Harry has an I.Q. of 137 obtained from reliable intelligence testing. He is now fourteen years old. Approximately how much longer can he be expected to continue to grow mentally? Would the answer be the same if the intelligence quotient were 63? What is the basis for your answer?

5. Would it be reasonable to expect that college students who were very deficient in reading ability would increase their intelligence test scores significantly by greatly improving their reading ability? Explain why or why not. If the answer is in the affirmative, would such an improvement in intelligence test score indicate a genuine increase in abstract intelligence or would it merely mean that the test was showing more truly the intelligence which was there all the time? Why?

6. In the following table are given the *averages* of the raw scores made on the Army Alpha tests by persons who reported the corresponding occupations in civil life.

40– 49	Farmer—teamster
50– 59	Tailor—barber—baker—bricklayer
60– 69	Machinist—blacksmith—auto-mechanic
70– 79	Receiving clerk—stockkeeper—shipping clerk
80– 89	Electrician—telegrapher
90– 99	Railroad clerk—filing clerk
100–109	Bookkeeper—nurse
110–119	Draftsman—accountant—civil engineer

This list is very incomplete and it should be remembered that these represent only the averages of scores for these occupational groups. Within each group there would be a wide variation.

How much justification was there for the following procedure? A veterans' rehabilitation adviser looked up an ex-soldier's Army Alpha score and found it to be 65, and said to the applicant, "All right, in which would you prefer training, machine shop practice, blacksmithing, or as an auto mechanic?" Explain why you think this was or was not a proper use of an intelligence test score.

7. In the American Council Psychological Examination there is one section which involves an artificial language. In view of the emphasis upon the importance of having all intelligence test items

sample experiences which are reasonably common to those tested, what is the justification for this material? Would zero or near zero experience be a basis for equal experience?

Suggested Readings

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KEY TO INTELLIGENCE QUOTIENTS OF THE BOYS PICTURED ON PAGE 171

A....	95	C....	127	E....	80	G....	121	I....	137	K....	133
B....	111	D....	92	F....	118	H....	105	J....	116	L....	100

Chapter 9

WHAT IS THE EFFECT OF EXPERIENCE UPON BEHAVIOR?

A Simple Instance of Learning.—A favorite occupation of a certain three-year-old boy was digging earthworms from the garden. He had no hesitation about picking them up, handling them, or putting them in his pocket. A year later he seemed very reluctant to touch them. It took some urging and demonstration to get him even to make the attempt. Then he cautiously picked one up only to drop it and jump back when it wriggled.

What had happened during the interval? Could it be possible that the change was due to increased maturity? A comparison of the play activities of this boy during the intervening year with the activities before that time suggests a much more satisfactory explanation. All his play with earthworms before his third year had been solitary. During the intervening year he had been playing with other children who screamed and ran at the sight of an earthworm. The best explanation, therefore, seems to be in terms of this intervening experience with the general situation of which the earthworms had constituted one important part. In other words, he had learned.

What Is Learning?—The incident described above is commonly said to be an evidence of learning. Learning usually designates a kind of modification of a response in which the change is brought about through the influence of the response itself upon the organism.

In line with the general point of view of this book, such changes in behavior must presumably depend upon corresponding changes in the structure of the total organism. Psychologists are in fair agreement that some organic changes probably do take place in learning and that these changes are probably to be

found in the central nervous system, but up to the present time there is very little agreement as to the nature of such changes. A discussion of the many points of view would be beside the point here. A much more satisfactory procedure for present purposes is to accept tentatively the general hypothesis of a structural change as basic to behavior changes and to turn to the problem of how learning can be controlled.

This does not imply that the problem of the organic basis of learning is unimportant. It simply means that for the beginning student of psychology such a problem ranks in importance below those concerned with controlling the conditions which produce the desired learned modifications.

Methods of Describing Conditions of Learning

During the course of time, several methods have been devised for describing the conditions under which learning takes place. Three of these will be discussed here because each emphasizes an important characteristic of the learning process. The first places emphasis upon the feeling tone within the learner during learning. The second emphasizes the relationship between stimuli from the environment and the learned reaction. The third has its greatest importance in emphasizing the rôle of organization of the whole learning process. If these points are kept in mind, it will be evident that there is no essential conflict between these descriptions of the learning process.

Thorndike's Laws of Learning.—The first of these descriptions of the conditions of learning was formulated chiefly by Thorndike and has had a very widespread acceptance in educational circles. Thorndike originally experimented with cats in puzzle boxes, and on the basis of these experiments formulated the now famous laws of readiness, use, and effect. Because they involve such matter-of-fact terms and are so readily interpreted, they have had widespread acceptance among non-psychologically trained educators. They were and still are extremely useful and adaptable rules-of-thumb by which the learning process in

schools and elsewhere could be guided. They are usually stated in some such manner as the following.

The Law of Readiness. When an organism is ready to act, for it to do so is satisfying, and for it not to do so is annoying. When an organism is not ready to act, for it to do so is annoying, and for it not to do so is satisfying. This principle has been criticized freely and can probably be defended by the scientist only in a very general way. It should be emphasized, however, that the criticisms lose much of their force when this law is roughly related to those conscious experiences which might be called states of readiness. It still remains a simple statement of fact that when a person is ready to learn, he will learn. It urges the importance of "striking while the iron is hot." It says nothing about heating the iron.

The Law of Use. Other things being equal, that connection (between stimulus and response) is most firmly fixed which is exercised the most. This is sometimes stated in the converse form in the law of disuse as follows: Other things being equal, that connection (already established) which is not exercised tends to disappear or lose its effectiveness. A corollary of the law of use is the law of frequency, usually stated as: Other things being equal, that connection is most firmly fixed which is most frequently exercised. In a similar manner, the law of recency states that: Other things being equal, that connection is most firmly fixed which has been most recently exercised. These statements taken together are frequently referred to as the law of exercise. The most significant criticism of this general law is that it seems to be true only in a limited degree. Practice does not always make perfect. In fact, unless the practice involves more than mere repetition, it apparently is not a very significant factor in learning. Thorndike's recent writings indicate that he places relatively little importance upon this principle.

The Law of Effect. This may be stated as follows: Those responses which result in a painful or annoying state tend to be eliminated or made weaker. Those connections which result in

a pleasant or satisfying state tend to be retained and made stronger.

These general statements are important and in a rough way do seem to be essentially true in terms of the layman's uncritical acceptance of the words or phrases descriptive of his behavior. It is possible to point out some rather significant objections and exceptions to these laws. Considerable experimental work has been done, some of which seems to verify one or more of these laws. On the other hand, other experimental work very definitely puts some objections in the way of their acceptance as universal statements of fact.

The chief objection to using these general statements of observed fact lies in the difficulty of controlling the states of satisfaction and annoyance as these terms are used by the non-psychologically trained layman. What may be a pleasure-provoking situation at one time or for one person may provoke annoyance at another time or for someone else. In other words, it is necessary to go beyond the situation itself in order to understand the "why" and "when" of the conscious states of pleasantness and annoyance.

Conditioned Response Method of Describing Learning.— At about the time that Thorndike was experimenting with his cats in puzzle boxes, a Russian physiologist, Pavlov, was studying glandular reactions in dogs. He was measuring the amount of the salivary response to different substances placed in the mouth when he noticed that the sight and smell of food and certain stimuli other than the presence of a substance in the mouth would produce a flow of saliva. Upon investigation he found that this flow could be produced by almost any conceivable stimulus under certain experimental conditions. He therefore called a response produced by any other than the original stimuli a "conditional response" to distinguish it from the response inherently made by the animal. Such responses are now generally called "conditioned responses."

The elements essential for the establishment of a conditioned response can be well illustrated by one of Pavlov's early experi-

ments. A buzzer was sounded simultaneously with the putting of food into the dog's mouth. This double stimulation was repeated several times. Then the buzzer was sounded without the food, and there followed an intense salivary response. Further experimentation revealed a wide variety of stimuli that could be used in place of the buzzer. In fact, it has been found justifiable to generalize to the extent that any response which the individual is capable of making may be attached (conditioned) to any stimulus to which he is sensitive.[1]

This method of conditioning has been widely applied in experimental studies of human beings. Mateer was one of the early experimenters to use this method with young children. Feeding chocolate was the original stimulus in her experiment. Opening of the mouth for the chocolate was the response studied. Ten seconds before the chocolate was given a blindfold was slipped down over the eyes. After several repetitions of this double stimulation the children opened their mouths as soon as the blindfolds were applied. In other words, the application of the blindfold was "conditioned" to become a stimulus for a response which it could not previously call out. Infants, children of all ages, and adults have many conditioned responses. For example, if the reader has not eaten for several hours, the very mention of food may call out a profuse flow of saliva. It is common to speak of one's mouth "watering" at the thought of a particularly well-liked delicacy.

It must not be thought that all conditioned responses primarily involve glandular behavior. Both simple and complex motor responses may be attached to new stimuli by this method. Ideational learning may also be explained as conditioning. This is illustrated by the customary learning of a simple number combination in school. The verbal response *four* is variously obtained from the pupil to the situation of two objects and two more objects *plus* the sound of the teacher saying "four." When this has been repeated a number of times, the response "four" to the non-verbal part of the stimulating situation is established. Emo-

[1] Florence Mateer, *Child Behavior,* Boston, Richard G. Badger, 1918.

tional responses are also readily conditioned. Recall Watson's experiment with the fear responses of the boy named Peter. As was pointed out in the discussion of emotions, what is feared by adults is largely the result of learning and can be accounted for in terms of conditioning where the facts about the individual's previous experience are known.

Conditioned response experiments have been conducted with infants as young as three months of age.[2] The principle seems to hold true for all kinds of learning and for human beings of all ages as well as all levels of animal life, from the one-celled creatures to apes and man. Conditioning does not explain what goes on in the nervous system, but it does describe the conditions under which learning takes place without the use of pleasure and pain or satisfaction and annoyance. All that is necessary for a description of the conditions of learning by this principle is to note the responses which the individual makes, the stimuli which call out the response, and the means at hand to substitute another stimulus for the one originally employed. Many present-day psychologists favor this description because of this greater objectivity.

Gestalt Method of Describing Learning.—First of all it will be necessary to state briefly ways in which the Gestalt school of psychology differs from other schools. In attempting to describe a pattern of behavior, most other schools of psychologists would analyze it into a series of simpler responses and would think of the whole pattern as made up of the sum or the serial arrangement of the smaller units. The food-getting behavior of the very young infant could aptly be described as a series or chain of reflexes. It is believed by many psychogists that this is true of most human behavior. They admit that up to the present most of the complex behavior patterns have not yielded entirely to analysis. But still more important is the fact that, after behavior has been analyzed and broken up into its smaller units, there still seems to be something left that defies analysis. Thus, when a complex motor act, such as playing the piano or peeling and eat-

[2] H. E. Jones, "The Retention of Conditioned Emotional Responses in Infancy," *Pedagogical Seminary and Journal of Genetic Psychology,* December, 1930, 37:485–498.

ing an apple, is analyzed into a series of reflexes, there is still no picture of the total behavior pattern.

The Gestalt psychologist insists that the whole behavior pattern is more than the sum of the reflexes and habits and that the very *wholeness* or *patternness* is itself an important element that must be taken into consideration for a complete description of the behavior. The Gestalt psychologist is concerned with discovering the conditions under which these several unitary acts, all of which are already familiar to the individual, are brought together in the relationships necessary to make a new whole act. Köhler,[3] one of the leaders of this school of psychology, carried out some extensive experimentation with apes. Many of these experiments have been repeated by Alpert,[4] using pre-school and kindergarten children as the subjects, with results for human beings that are startingly like those obtained by Köhler with his apes.

The Gestaltists object, too, to the usual maze experiments of other psychologists. They insist that such experimental set-ups do not permit the subject of the experiment to employ his capacity to discover relationships. They insist that a learning experiment should be made in such a manner that it will enable the subject to utilize the significant parts of the situation in order to gain an insight into the whole of it. They contend that this gaining of insight is the chief element of learning. It might even be permissible to use the word "understanding" in place of insight, since gaining an insight means essentially understanding the relationships within a stimulating situation as a whole in terms of the previous experience of the learner. When such insight is gained, the solution of a problem is essentially complete.

In the work of Alpert, the usual situation consisted of some variation of the following conditions: A child is separated from some familiar and favorite toy. The only means of obtaining the toy is through some roundabout method. The object of the experiment is to determine whether the child can see the necessary

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[3] W. Köhler, *The Mentality of Apes,* New York, Harcourt, Brace & Co., 1925.
[4] A. Alpert, *The Solving of Problem Situations by Pre-School Children,* New York, Teachers College, Columbia University, 1928.

relationships of the familiar objects which are conveniently placed nearby.

In one experiment, a three-year-old girl was placed in a play pen that was too high for her to scale. She could reach between the upright bars but could not crawl between them. A favorite toy was placed on the floor just beyond reach. Inside the pen was placed a light bamboo stick with which the child was already familiar as a general plaything, although it had not previously been used as a tool for securing objects. The experimenter then withdrew to a point where she could watch, but she did not assist the child in her attempts to secure the toy. At first the child tried to secure it by reaching. When this failed, she called upon the experimenter and even showed some emotional responses when she was ignored. Then she began to play with the stick, but at first without using it as a tool for getting the toy. Suddenly—and the suddenness is apparent in many Gestalt experiments—she seemed to understand the relationship between the stick and the toy and forthwith promptly pulled the toy to her with the stick.

Not every instance of insight results in complete success. In fact, in many instances the relationships discovered may not be pertinent to the solution. Sometimes these insights lead to solutions that are correct enough but impossible to carry out. The satisfactory solution must be one that is both correct and possible of execution. It is significant to note that no new motor acts of a unitary kind need be involved. The several acts involved in the solution of a problem are often already familiar. The learning consists of gaining an insight into the total situation and of putting the individual parts of the whole into their correct functional relationship.

The Gestaltists insist—and in this they are joined by some other psychologists—that every instance of learning is the result of activity on the part of the learner. The essential characteristic of this learning activity is the putting together of the parts. It might be better described by saying that it consists of "seeing together," or perceiving the relationship between the several parts of the whole situation. Mere frequency of repeti-

tion is of no particular significance to the Gestaltist. The new situation must take on meaning as it is learned. In the absence of meaning, learning is very difficult and, indeed, may be of a very limited kind and usefulness. It is quite possible that there is no learning at all in the absence of the development of some kind of meaning. In memorizing a list of nonsense syllables which have been so constructed as to prevent their having any recognized meaning, the act of learning may consist of discovering or inventing meaning in terms of rhythms, cadences, and sequences.

The following illustration is drawn from a schoolroom task of the elementary grades and is an excellent example of the suddenness and permanence of learning that comes when the problem situation is so arranged, and its elements so emphasized, that the learner has an opportunity to discover the meaningful relationships.

A boy in the fourth grade was having difficulty in memorizing his number combinations in the order from one to ten. Each new table seemed to be more difficult than the preceding one, and the boy, possibly feeling very sorry for himself, was complaining bitterly about the very hard number combinations in the tables of nines and tens. More by way of encouragement than anything else, his father wrote out the table of tens in irregular order, and pointing to it asked the boy: "Do you see anything interesting or unusual about this table?" After the boy had made several irrelevant comments, the father pointed to the zeros in the column of products. An expression of delight at the discovery of this relationship revealed itself in the boy's face as he exclaimed: "They all end in zeros." He was then asked if he could see anything else that was interesting. This time without any further assistance he discovered the relationship between the first digit in the product and the multiplier. Again there was an expression of delight, almost of amazement, whereupon the boy dashed off to his mother, in another part of the house, exclaiming, "Mother! I know my tens. I know my tens." As a matter of fact, the whole table was completely learned in permanent form without a single repetition.

In the case of the other tables, the boy had seemed to show a remarkable ability to forget the combinations almost as fast as learned. With the table of tens, the combinations were available at any time. The discovery of the significant relationships, the gaining of an insight, as the Gestaltist would describe it, resulted in learning because the new meaning had been gained through organization of the various elements. The difficulty that the boy encountered with the multiplication tables was probably much the same as the adult encounters in trying to memorize a series of nonsense syllables. The fact that they are meaningful to the adult does not insure that they have meaning to the child.

The boy's father then attempted to utilize the same method with the table of nines. This time there was greater difficulty in getting him to see the important relationships because of the complete abstractness of all his previous number experiences in school. Few adults seem to have discovered for themselves the relationships in this table by means of which the learning of the combinations becomes somewhat meaningful.

$9 \times 4 = 36$
$9 \times 7 = 63$
$9 \times 2 = 18$
$9 \times 8 = 72$
$9 \times 9 = 81$

$9 \times 3 = 27$
$9 \times 6 = 54$
$9 \times 1 = 9$
$9 \times 5 = 45$
$9 \times 10 = 90$

What relationships can you discover that aid in organizing this table?

In commenting upon this method of describing learning, it is well to make clear the contribution of the Gestalt emphasis. In addition to all the individual parts that go into learning an act as a whole, there is a significant further factor which may be called the organization of these parts into the whole. Playing a scale on the piano is more than striking the right individual keys. It involves both a sequential relationship and that relationship expressed by rhythm. If a bar of any familiar melody is played in one key, it is recognized not only as a series of notes; it has meaning as a whole, that is, as a melody. This melody may be transposed into another key so that, actually, different notes are involved, but if the same sequence of notes and the same rhythm

is kept, it will still be recognized as the same melody. Here the essential nature of the whole is much the same, although the parts making up the whole may be very different. But if the *same notes* are played in *different rhythms,* the result may be interpreted either as "Yes! We Have No Bananas" or "My Bonnie Lies Over the Ocean." In this case the different rhythmic organization of the parts makes the essential difference.

On the other hand, to say that all learning is the result of discovering relationships seems to be going beyond demonstrated facts. The facts as they have been substantially demonstrated by the experimenters with other points of view seem to indicate that analysis is unquestionably of importance. The Gestaltists have made a real contribution to the understanding of the conditions of learning, but they have hardly supplanted all other attempts to describe learning. In fact, it is possible to explain the process of the discovery of new meaning in old situations in terms of the Thorndikian psychology and in those of the Pavlovian conditioned response. The contribution of the Gestalt movement lies in the emphasis that it has placed upon the importance of the discovery of meaningful relationships in the whole learning situation. This implies that teaching is the process of arranging the learning situation in such a way that the learner can easily discover important relationships.

There are other ways, too, of describing what happens during learning as far as conditions within and without the learner are concerned. The three mentioned above are the most important for the purpose here.

Formation of Complex Habits

Grouping of Simple Responses into Larger Patterns.—Another important problem of learning concerns the formation of larger patterns of habits from simpler acts. If the responses of a skilled typist are compared with those of a beginner, one sees that there are, indeed, very great differences. In writing a word the beginner makes several distinct responses, each to a relatively simple stimulus. In writing the word "study," there are at

least five separate responses. The skilled typist sees the word as a whole or may see it only as part of a phrase of several words. As a matter of fact, it is not at all uncommon for the typist to reproduce correctly a word that is misspelled in the copy. The most satisfactory way of explaining this is that the typist is not responding to the individual letters at all but to the word as a whole, which acts as the appropriate stimulus for a pattern of response in spite of the errors in spelling.

All three of the characteristics of learning already emphasized are important in understanding what happens in such cases as learning to typewrite, but the second and third are the most useful. This part of the process of learning is sometimes called foreshortening and overlapping. By means of conditioning one can understand much of this foreshortening process. The original response of striking each key is made to a visual stimulus of seeing each letter separately. But as these responses follow each other, there is present, for each letter after the first, another significant group of stimuli. These are the mechanical forces applied to the sense organs in the muscles, tendons, and joints by the changes in shape and position of these parts of the body. Consequently, there are always present the two stimuli necessary for conditioning a response. One of these is the sight of the letter. The other is the group of kinesthetic stimuli produced by the response of the preceding letters. In this way, making one response in a series tends to set off the ones which follow, and the more thoroughly habituated these responses become in that order, the more likely is the complete series to follow from the beginning.

On the other hand, the Gestaltists emphasize the point that the formation of large habits from simpler responses depends upon the learner's discovery of further relationships between the parts of the whole stimulating situation. Until one gains an insight into these relationships, increase in skill of performance is limited. An illustration from a high school course in geometry will make this clear. A pupil may learn to demonstrate a particular theorem with only an insight or recognition of which statement in the printed solution follows the preceding one. He may

not have any insight at all into the geometrical or logical relationships. In such a case the performance is of a very limited type. Gaining more significant insight into the relationship of the several parts of the whole situation is of much greater importance in this case than the mere foreshortening as in the case of playing a piano scale or using the typewriter. Gaining such an insight into the more significant relationships is an important contributing factor in making a smooth, fast-running pattern of the several parts, each previously understood by itself.

Can a Learned Response Be Used in a New Situation?—This is really a very important question. Stated in other words it means: Can one benefit by past experience when one meets new situations?

Common observation makes it evident that this can and does happen at least to some degree. But observation also leads to the conclusion that there are many times when past experience is not utilized in new situations even though the new situation seems to be quite similar to the old. Consequently, the question naturally arises as to what determines the conditions under which transfer of learning can take place. Is there anything that can be done during learning that will tend to make the results more usable in a wide variety of situations?

Thorndike has answered these questions concerning transfer in terms of what he calls *identical elements*. An identical element is one which belongs to both responses, the old one which has been learned and the new one which demands a solution. Consider the following case: During the World War I was thoroughly drilled in the act of saluting. In fact, a great deal of stress was placed on it. If I was standing, it was required that I stand up straight with feet together, head up, chest out, etc. About a year after separation from the service I was standing on a street corner talking to a friend. The conversation was extremely informal, and so was my position, with one foot sustaining my weight, the other thrust forward and raised somewhat to the curbing in front of me. A woman of my acquaintance passed, and I tipped my hat in the manner prescribed by custom.

After she had gone, my friend called attention to my action in tipping my hat. He told me I had "come smartly to attention" before bringing my hand to my hat. There were some identical elements in the army and civilian situations. The total responses were similar but not identical. In the army the response consisted merely of bringing the hand to the brim of the hat in the prescribed fashion. The civilian salutation consisted of taking hold of the hat, in this case not by the brim but by the front of the crown. It was the accompaning behavior only that was identical, and this part of it was less essential in civilian life than in the army.

It has been pointed out by a number of psychologists that the mere presence of identical elements in the new and old responses does not in any sense guarantee that they will be utilized. They must be brought distinctly to the learner's attention in some manner before this is possible. In high school physics, one may have studied the important laws and principles governing the application of force. But even with this hint only a very few can correctly state the physical law explaining why the common revolving water sprinkler revolves. When one of Newton's laws of force is cited—"to every action there is an equal and contrary reaction"—some will at once recognize that it applies, but will say, "We did not study about water sprinklers. We studied about the recoil of guns." That is just the point of this illustration. Until the elements of two situations which are identical have been pointed out, one is not able to use previous information in solving a problem.

It should be noted that such employment of previously learned responses is often either wholly inappropriate or at least partly unsuited to the new situation. Such instances might be called cases of *negative transfer,* i.e., cases in which previous experience interferes with rather than aids in the correct response to the new situation. Examples of this are very frequent in everyday life. The experienced tennis player takes up handball and finds that his old habits of hitting the ball with the racket must be partly remade. They interfere with his success in hitting the ball with the hand.

Judd [5] has emphasized a somewhat different point of view regarding this question of training transfer. He stresses the importance of building up generalizations, i.e., a generalized and complete understanding of the principles or elements common to the two situations. Such a generalization can be developed by experiencing a number of situations, all of which deal with the particular principle involved. Out of the experience of discovering these similar elements among the many dissimilar ones will evolve a more complete generalized knowledge of the principle which thus becomes available in a wider variety of situations and can be used in the solution of new problems. Hence, Judd would not teach the child a ready-made rule and follow it by several applications for purposes of illustration. Instead he would advocate giving the learner experience with a wide variety of activities employing this principle, encouraging and directing the learner in discovering for himself the pertinent principle. This, he believes, would develop a better generalization, by means of which the learning would be more transferable than if dependence were placed upon the mere presence of identical elements. It might be said that it is important to learn how to *discover* identical elements as well as how to *use* them once they have been discovered.

An Outline Summary

1. The characteristics of a learned response.
    - A. Learning consists of a modification of a response as the result of experience.
        - (a) Learning, so far as behavior can be observed, consists of changes in already existing responses.
        - (b) Learning presumably depends upon some change in organic structure, probably in the nervous system.
2. Methods of describing learning.
    - A. Thorndike's "Laws of Learning."
        - (a) The most significant general characteristic of this description is the importance attached to the conscious states of satisfaction and annoyance as determiners of learning.

[5] C. H. Judd, *The Psychology of Secondary Education,* Boston, Ginn & Co., 1927, Ch. 19.

B. The conditioned response.
   (a) Here the chief characteristic is the complete objectivity of control of the learning process. Control is entirely in terms other than the consciousness of the learner and has to do largely with factors outside the learner.

C. The formation of configurations (Gestalt).
   (a) Here the chief characteristic is the emphasis upon learning in terms of whole, meaningful patterns by a reorganization of experience previously devoid of the particular meaning that comes from the reorganization.

3. Formation of complex habits.
   A. Several simple responses may be grouped and associated to form a more complex response where only simpler and partial responses existed before.
      (a) Here the different methods of describing the control of learning also apply, although particular importance should probably be attached to the reorganization of meaningful, whole experiences.
      (b) Learning may be aided or hindered by what has been previously learned. Here too the several methods of describing learning may be applied, and here again the Gestalt emphasis probably has particular significance.

Problems for Further Thought

1. Why does it make relatively little practical difference to the parent or teacher what the neurological changes in learning may be?

2. Describe in some detail the results of your observation of a child's efforts to learn or solve a new problem. It should involve a problem that is not solved so easily as to make the learning behavior difficult to observe.

3. From your own experience or observation cite several instances in which repetition did not play an important part in the learning process. Cite several others in which there was much repetition in practice without very much improvement.

4. A basketball star player "goes stale." He can no longer hit the basket with his former assurance. The harder he tries and the

more he practices, the worse he seems to get. The coach orders him to "lay off" practice for a week, assuring him that he will then be all right. After a week of not practicing he is again in his old form. How do you explain this result of not practicing?

5. Cite several experiences of your own efforts at learning which did not seem to be going well until you "saw the point," after which the problem was solved to a degree that represented near perfection. Problem situations involving rules of grammar in English or a foreign language, in the sciences, in mathematics, and with mechanical puzzles should furnish experimental material for this exercise.

6. It usually happens that a person learning to skate attempts to use the habits already well learned in walking. The extremely well established walking habits tend to transfer (negatively) to the skating situation so that they interfere with the new skill. Cite other examples from your experience of both positive and negative transfer. For some of the instances use situations that involve insight into the principles involved as in the case of Newton's law of force and the explanation of the working of the revolving water sprinkler.

Suggested Readings

Gates, A. I. Psychology for Students of Education. Rev. ed., New York, The Macmillan Co., 1930. Ch. VIII, "Laws of Learning," pp. 253–288. This is a good elementary discussion emphasizing a modified form of Thorndike's point of view.

Guthrie, E. R. The Psychology of Learning, New York, Harper & Bros., 1935. This is a brief and very readable discussion of learning, emphasizing the conditioned response method of explaining the conditions of learning. For a briefer treatment, see Smith and Guthrie below.

Heidbreder, Edna. Seven Psychologies. New York. D. Appleton-Century Co., 1933. Ch. IX, "Gestalt Psychology," pp. 328–375. This is a simple account of the principles emphasized by Gestalt psychologists. For a more comprehensive discussion of learning from this point of view, see Wheeler below.

Smith, Stevenson, and Guthrie, E. R. General Psychology in Terms of Behavior. New York, D. Appleton-Century Co., 1921. Ch. III, "Learning," pp. 75–133. This is an elementary and simple discussion of the conditioned response method of learning written several years ago. For a brief statement it is still an extremely satisfactory statement of this point of view.

Wheeler, R. H., and Perkins, F. T. Principles of Mental Development. New York, T. Y. Crowell Co., 1932. Ch. II, "The Laws of Human Nature," pp. 16–38; Chs. XIII to XVIII incl., "Analysis and Control of the Learning Processes," pp. 239–347. There is no satisfactory brief statement of the principles of learning from the point of view of Gestalt psychologists. This is probably the most satisfactory statement available. For a brief account of Gestalt psychology as a whole see Heidbreder above.

Chapter 10

SOME OF MAN'S WAYS OF BEHAVING NOT EASILY OBSERVED

Introduction.—The preceding chapters have dealt with those phases of behavior which are most easily observed and are therefore familiar to most people. It is necessary now to give attention to some of the more subtle phases of man's complex behavior.

"Consciousness" may be just a convenient name for those aspects of man's behavior which cannot be attributed to the observable operation of muscular and glandular parts of his organism. The exact nature of consciousness often escapes the attention even of the person possessing it. The most frequent method of examining it is that of introspection—the process of looking critically into one's own consciousness. The most serious difficulty involved in introspection is that the thing being observed is purely personal. No one else can observe it or know of it except as the observer makes available the results of introspection by means of verbal report; and since there is often great variance in the terms employed by different observers to describe states of consciousness, confusion frequently results.

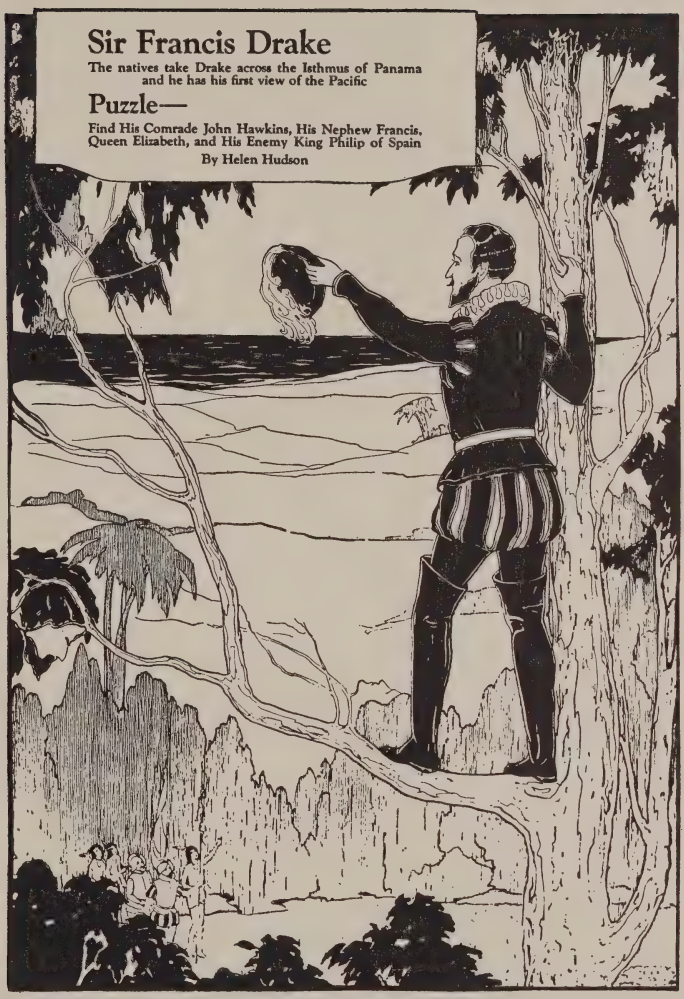
The behavior involved in thinking is a response of certain muscles and glands, and the simultaneous employment of these same parts by other activities definitely interferes with thinking. Thus, one may carry on any kind of motor response so long as it does not involve the muscle groups most necessary to thinking. One may ride a bicycle, walk through a crowd in the street, hoe one's garden, or engage in any similar activity without materially interfering with thinking. But it is difficult or impossible to carry on a conversation about one topic and think clearly about another. Some people even find it difficult to think and, at the same time, do anything else that involves the speech apparatus. A smoker's pipe often goes out when he is in deep thought.

A large part of thinking can best be accounted for in terms of sub-vocal speech. If one can talk aloud about a problem, either to oneself or to someone else, the solution is thereby often brought nearer. Individuals undoubtedly differ very much in the degree to which they reduce the thinking process below the threshold of an observable response. Some can think clearly about abstract problems only when they can formulate all their thoughts orally, while others succeed in their thinking with only a minimal amount of sub-vocalization. The effectiveness of the thinking cannot be judged by the amount of observable vocalization employed.

What is true of thinking seems to be true also of other kinds of activity such as imagining, dreaming, perceiving, and reading. It is probable that many responses of this sort occur in the everyday activities of every person. To omit from an analysis of human behavior these important ways of responding would result in a very incomplete picture. And, since it is a part of many of the other more complex kinds of behavior, perception will be the first to be discussed.

What Kind of Response Is Perception?—The word *perceive* literally means "to see into." Familiar synonyms for perception are "insight" and "recognizing." Perception is a very brief kind of response; in fact, the response itself is characteristically of such short duration that it is difficult to study directly. An illustration of a rather familiar experience may serve to throw further light on its fleeting character.

Everyone is familiar with the kind of drawing, frequently found on puzzle pages of magazines for children, which portrays some familiar landscape scene with many trees and shrubbery. The legend beneath the picture says that a person or animal has been lost and is to be found somewhere in the detail of the picture. The reader is asked to look for it. After scrutinizing the outlines of the landscape, there are suddenly to be seen the features of the missing person (or animal), so placed as to be an integral part of the scene as a whole. When once perceived it becomes difficult to avoid seeing that part of the picture which could not be seen before. In fact, it stands out so clearly that it seems impossible


Sir Francis Drake
The natives take Drake across the Isthmus of Panama and he has his first view of the Pacific
Puzzle—
Find His Comrade John Hawkins, His Nephew Francis, Queen Elizabeth, and His Enemy King Philip of Spain
By Helen Hudson

A PUZZLE PICTURE

(From *Our Puzzle Book,* by Helen Hudson, copyright 1933 by Rand McNally & Company.)

that the figure could so long have remained hidden in the intricacies of the drawing.

The simple example of the act of perceiving involves, of course, recognizing, understanding, and interpreting the whole picture of the landscape. But in such responses familiarity with the object represented causes the process of perceiving to become so automatic that it is difficult to recognize the perceiving response itself. However, when the new perception is produced in this unusual way, it makes a significant change in the total pattern.

In other words, the total response to the stimulation now differs from the total response previously provoked by the same group of stimuli. Of course, in this instance, two different perceptions are involved. Perception is just as truly present in the first interpretation of the picture as in the second. What really occurs is that one experiences two perceptions of the same stimulation in so far as the actual lines on paper constitute such stimulation. What has happened in the process of changing is that the person, in making the new perception, completes a new organization of the elements which make up the stimulating pattern. This process of organization is always involved in perception and constitutes one of its most essential characteristics.

Ordinarily perception is a complex response to a complex stimulating situation. It is only rarely that in situations outside the laboratory the activity of perceiving can be simplified into an elementary experience. In the laboratory a number of devices are used to simplify the process. One of these is called a *tachistoscope.* The tachistoscope presents stimuli to the subject under highly controlled conditions. It consists primarily of a window in a screen, which is closed by a shutter. This shutter can be so operated as to expose the stimuli for very brief periods of time.

It is a characteristic of vision that one sees only while the eye is momentarily stopped and fixed upon a particular point in the environment. This point of attention may shift very rapidly, but perception does not take place during the movement of the eyes from one point to another. If the shutter on the tachistoscope is open for a period of approximately one-tenth of a second, it will insure that the subject can see only during one fixed posi-

tion of attention. Using that length of exposure, the subject may be presented with a variety of visual stimuli and be required to reproduce what is perceived during the short time of exposure. The importance of organization in perception is nicely shown by such an experiment.

One such study will be used here for purposes of illustration. All the stimuli presented were numbers or letters typewritten on cards. First a series of evenly spaced capital X's were presented, and the subject was asked to indicate how many were seen. When there were from one to four he was positive of the number. When there were five or more in the series, he was unable to state the correct number positively. Numerical digits were then substituted for letters. The subject could reproduce the digits exactly in their correct order if there were no more than four. Increasing the number of digits beyond that point resulted in lack of certainty. It is interesting to note that there is a considerably greater degree of accuracy of the digits at either end of a long series than at the middle. Next mixed capital letters were substituted for digits with practically the same results. Notice that when the material consisted of more than four unrelated or relatively unrelated units, the subject was unable to reproduce them accurately. The next step was to use familiar words. Here the subject recognized accurately words up to nine and ten letters long with the length of exposure remaining the same as before. When unfamiliar words were substituted for the familiar ones, the subject was again confused and inaccurate for words of more than five or six letters. Finally, short sentences of familiar words were exposed as in the preceding parts of the exercise. The first sentence consisted of two words, "good morning." This was clearly reproduced. Increasingly long sentences were employed with perfect reproduction up to the sentence, "I am going at two o'clock." This was the full capacity of the shutter on the particular tachistoscope employed.

Notice some of the significant factors in this little experiment. When the material to be perceived had only a limited possible meaning, the act of perceiving involving the organization of these limited meanings had very narrow limits. Thus, with the X's

the only possible normal meaning would have to be expressed in terms of the nature and the number of the units. When dissimilar letters were employed, the number of units perceived at a single exposure remained approximately the same despite the fact that the units themselves were different. In this case, however, the units were familiar to the person; that is, they had the usual limited meaning of numbers and the letters of the alphabet. When familiar words were employed, the organization could encompass a much larger absolute number of units, because they could readily be organized into units familiar as a result of previous organizations. This clearly indicates that the words were perceived as units and not in terms of letters. The same is true of the sentences composed of short familiar words. Here the organization in perception is still more complex. The words themselves are units in larger organizations.

Organization is the keynote of the activity called perceiving. By means of this organization the individual interprets the stimuli presented in such a way that the whole thing becomes a meaningful experience. Thus it becomes evident that acts of perceiving are based upon previous experiences. Any new or unfamiliar sensory experience is difficult to perceive and when perceived requires interpretation in terms of familiar or apparently related previous experiences. This involves the whole question of false or incorrect perceptions, called illusions, which will be discussed later.

It must not be thought, however, that perception takes place only through the sense of vision. Perception may involve any of the numerous kinds of sensory experience of which the human being is capable. Auditory perception, for example, involves the organization of auditory experience. As this is being written, an auditory stimulus is interpreted as the slamming of a door at the other end of the corridor. Other auditory stimuli are given the meaning of someone walking on the floor of the room above. Still others are interpreted as meaning that two persons are talking some distance down the hall. In fact, in this last instance, the identity of the individuals is included in the perceptions, although no names are heard.

WHAT FIGURE CAN YOU ORGANIZE FROM THIS PATTERN OF BLACK AND WHITE?

See footnote on next page. (From Street, *A Gestalt Completion Test,* by permission of Bureau of Publications, Teachers College, Columbia University.)

In a similar way olfactory and gustatory perceptions are involved in everyday experiences. Certain odors are interpreted as meaning the presence in the environment of certain objects, even though the objects themselves are not present to any other sense organs. Much of the enjoyment of eating is directly and indirectly dependent upon olfactory and gustatory perception. In the dining-room situation there are additional visual stimuli, so that the total perceptual response may involve a meaningful organization from stimuli present to several senses simultaneously.

The kinesthetic or muscle sense organs play an important rôle in motor responses, but are ordinarily overlooked. Many familiar gestures and organized motor responses are involved in such everyday activities as conversation, walking, and other movements of locomotion. The muscular tensions resulting from the stimulation of the kinesthetic sense organs in the muscles, tendons, and joints are interpreted by the individual in terms of previous experience, so that appropriate muscular responses are made as in complex motor habits. Only when there is a disturbance of these sense organs does one appreciate the importance of kinesthetic perception. Without them, organized motor habits of even the simplest nature would be impossible. Because the kinesthetic sense organs are so numerous and so widespread throughout the muscular parts of the body, they cannot be studied as easily as can the sense organs of vision, audition, and olfaction, and are therefore not as well understood at the present time.

Illusions.—Illusions are false or incorrect perceptions. When a sensory stimulus is interpreted as something other than its usual self, the response is called an illusion. Much of the information about perception has been gathered from studies of illusions. When the same stimuli are interpreted in two or more ways alternately, it is possible to understand the significance of the "set" or direction taken in the process of organizing the response. Look at Figure 6 (chair illusion). A chair will probably be recognized, at first facing forward with the seat below the eye level; consequently the upper surface of the seat will be seen. Now

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Picture on page 203. Can you see a knight on horseback?

look at it again and see if it can be perceived in another way. The most probable successful response in this case will be one in which the chair is seen from behind, facing away and to the right. This time, however, the chair is above the eye level and the under surface of the chair seat will be seen.

This second perception of the same black lines on a light surface will be more difficult for most persons to attain and maintain than the perception first described. The reason for this seems to

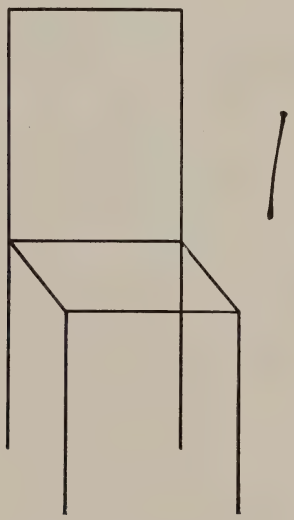


Figure 6. Chair Illusion

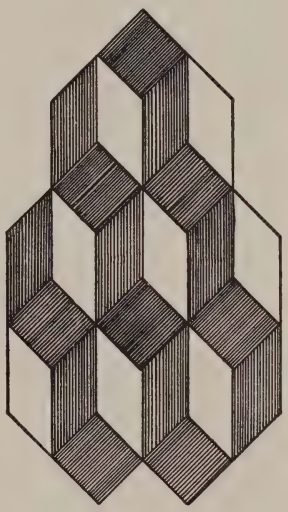


Figure 7. Cube Illusion

be that the usual experience of a person looking at a chair is more likely to be from the front than from the back and from above the level of the seat rather than from below. In other words, the most common experiences from previous similar situations will most easily be organized with the present stimuli of the figure to produce the total response of perceiving a chair.

Figure 7 is another familiar double figure. Can you see in this figure either six or seven cubes alternately?

Look at the shadows in the picture on the surface of the tank of the locomotive in Figure 8. Do these shadows represent inden-

tations or bulges on the surface? Now turn the book upside down and look at the figure again. How do you account for what you have seen? In answering this question notice the direction of light in the picture and remember how light would normally fall upon such a surface as a cylindrical tank. Does it come from above or from below? Will the answer to this question

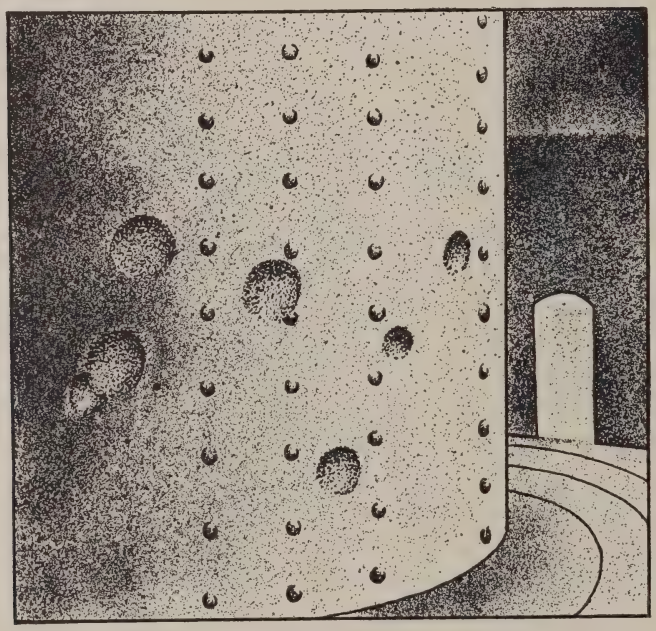


Figure 8. Tank Illusion

make it possible to explain why, in one position, the shadows appear to be caused by protrusion from the surface and in the other position by indentation into the surface?

Figures 9 and 10 are other illustrations of well-known visual illusions. Figure 9 can be seen either as a garden vase or as the profile of two faces. Figure 10 can be perceived as the head of either a duck or a rabbit.

Auditory illusions are involved in many cases of ghostly tapping, stair climbing, and door slamming. Natural phenomena

probably cause the auditory stimulations which are organized by the hearer to mean the sounds of the passing of some ghostly visitor. As beautiful an illustration as one could wish occurs in Kipling's *My Own True Ghost Story,* in which the author tells how he lay awake all one night and listened to a game of billiards in the next room, played by the ghostly former inhabitants of the bungalow. He knew this room to have been a former billiard

Figure 9. Vase Illusion

room, but he also knew that, at the time, it contained no billiard table. In the bright sunlight of the next day he discovered that the whir of the balls on the tables had been the scurrying of a rat in the ceiling cloth, and the click of the balls, a loose window sash rattling in the storm. In this incident the process of organization of previous experiences, sometimes called mind-set, is clearly evident. In the morning light, when this mind-set or direction of organization had been changed, it was impossible to interpret the stimuli as before. This is a rather unusual incident, but

its very unusualness makes clear the process involved in perception.

Illusions of disturbed balance may arise from an incorrect perception of a stimulus affecting the sense organs of equilibrium. An illusion involving a combination of sound and equilibrium is the old parlor trick of blindfolding a person and directing him to step on a board which has been placed two or three inches above the floor. Thereupon, two persons seize the ends of the board and proceed to jiggle it as if they were lifting it. In the mean-

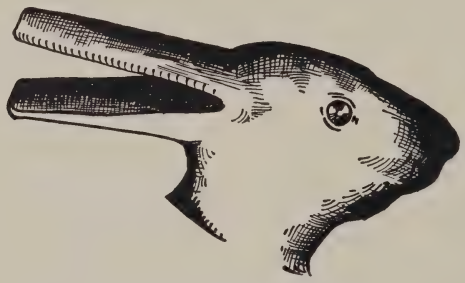


Figure 10. Duck or Rabbit?

time the other members of the group crouch down close to the floor and continue the conversation without interruption. The subject is then commanded to jump. The board is actually only an inch or two from the floor but the subject's behavior in jumping from it clearly indicates his illusion of being a considerable distance in the air. In this performance the direction of the auditory stimuli contribute a very important part of the total stimulating pattern that is incorrectly perceived.

Imagery.—Imagery is the name commonly given to a subtle type of behavior in which the response is in some measure the recreation of a response previously experienced. Images may be said to be reenacted responses to a sensory stimulus arising at a time when the material substances involved in the previous experience are not actually present to the senses. Imagery may involve any type of previous sensory experiences—visual, auditory, kinesthetic, and others. They may differ in the vividness of their

reenactment from almost exact reproductions of the previous experience, on one hand, to vague, indefinite, and incomplete forms, on the other. Some persons declare that they have no imagery at all, while others give behavioral evidence of the fact that they can re-create accurately some previous experience.

In the image, regardless of the type of sense organ involved, the most significant factor seems to be the element of re-creative organization of the previous experience. Nothing new may be added and nothing old omitted, although usually the image is not nearly so exact a reproduction of the previous experience. This reorganization of experience has the same general characteristics as has the process of organization involved in perception. Differences in vividness of imagery depend largely upon how much the previous organization in perception directs the reorganization in the image. Studies of phenomena of imagery are by no means adequate, but evidences of significant motor responses can be detected in the behavior of the person reporting the image. These responses may be so subtle and so commonplace as to escape the attention of any but a carefully trained observer. Although they may be detected in some persons to a noticeable degree, they cannot be observed so readily in the behavior of others. There seems to be little doubt that the essential nature of the total behavior involved in imagery includes a significant amount of muscular and glandular activity which serves to reenact the original behavior. Problem 7 at the end of the chapter provides an opportunity to experiment informally with this phenomenon.

Verbal stimulation may call forth a reproduction of a previous response that was largely non-verbal, but if one has had only limited experience with the words used for the stimulus there seems to be difficulty in creating any image at all. For example, what visual image is suggested to the reader by the term "Dodo bird"? In what way is the image related to previous experience? The author's image of a "Dodo bird" is limited to a vague reproduction of an illustration in a book read years ago.

Imagination may be definitely creative. In fact, all imagination involves some variation from the original. Certainly all

creative work requires imagination, as is evident in literature, painting, sculpture, and music. Stark realism soon loses its interest, and a work of art that is merely an exact reproduction of some very familiar experience soon loses its appeal because it provides no opportunity for the play of imagination. It is important to recognize, however, that in this creative use of the imagination, what is created is a new arrangement or a new combination of the old experiences of the artist. The elements involved may come from a considerable range of the artist's experiences, but they are brought together by him in this new arrangement. Only in that sense has something been created.

Some persons have pronounced auditory imagery, while others enjoy a highly developed kinesthetic kind. In the latter instance the imagery seems to involve chiefly muscular responses, and this kind of imagery is frequently combined with that which is predominantly visual or auditory. The person who is imagining the sound of a piece of music often seems to employ a kinesthetic type of response which had previously been called out in the actual presence of the auditory stimulus. A master violinist reports practically no visual imagery of the notes of a piece of music. Asked to play an all-but-forgotten piece, he can be observed fingering the strings with the left hand. Soon the music comes, but he says he has no idea of what lies more than a measure ahead. Here the imagery is dependent upon kinesthetic responses involving the muscles of the hand and arm. In a similar way some persons seem to have very definite olfactory and gustatory imagery, although these are rarely reported.

Reading.—Certain phases of reading are very closely related to the process of perception. For convenience, the process of learning to read may be divided into two somewhat distinct groups of skills. One of these depends almost exclusively upon the development of appropriate sensory-motor skills such as the movement of the eyes in a succession of jumps and pauses across the page.

On the other hand, there are some subtler phases of reading which cannot be observed readily, but which are important in the more advanced types of reading. It is necessary for the

reader to perceive, recognize, or understand the successive groups of printed symbols. However, even when the reader can do this correctly, he may still be unable to understand satisfactorily a paragraph of such symbols. In other words, reading requires not only the perception of each symbol on the page; it also requires the organization of the meanings represented by the complex groups of words and sentences.

Students of secondary school and college level frequently report that they can read a whole page of print, recognizing every word, perhaps even subliminally pronouncing the words, only to be chagrined at the end to discover that they have not really understood the meaning of what was read. Such a difficulty clearly indicates the importance of the process of the perception of the large related groups of words making up the sentence, the paragraph, and the topic. It implies that the development of skill in reading demands, in its upper levels, considerable emphasis upon training in organizing such of the reader's experiences as are related to the symbols on the printed page.

Perception in reading takes place during the pauses of the eye as it moves along the page. These pauses are very brief and correspond approximately to the exposure of the material in the tachistoscope. Meaningful subject matter is much more easily read than material that has little meaning. That is the principal reason why it is so difficult to read an author whose vocabulary or style is unfamiliar. Many persons, for example, find the English translation of Sigrid Undset's *Kristin Lavransdatter* very slow and difficult reading, even though it is interesting. In this case the translation has carried over the idiom of the Norwegian language to such an extent that the English reader finds himself handicapped by unfamiliarity with the style.

Thinking and Problem Solving.—Both thinking and imagination are based upon previous experience. Thinking, like imagination, is the result of new combinations of this previous experience.

Thinking differs from imagination in several important respects. One of these is the differences in control through sensory

stimuli either directly involved from the environment or resulting from recalled experiences. In imagination, recalled ideas are allowed to go on more or less unchecked and uncontrolled by what the individual is immediately experiencing or remembering. This freedom from control may vary all the way from extreme random fantasy to the controlled imagination of creative art. When the control is still more restrictive, the resulting activity is called thinking. Hence, the imagination of the creative artist stands midway between the uncontrolled imagination of fantasy and the cautiously developed, carefully controlled thinking of the mathematician engaged in solving a problem. In thinking, then, the rigorousness of control not only serves as a characteristic of good thinking, but it distinguishes thinking from imagination.

Like imagination, abstract thinking involves the manipulation of ideas. It also resembles trial-and-error motor learning. In a motor activity such as solving a mechanical puzzle, there is usually considerable manipulation of the objects present to the senses. The clever thinker, confronted with a mechanical puzzle, will manipulate the parts of the puzzle less than will the poor thinker. Instead of manipulating the parts themselves, the clever thinker manipulates them in terms of ideas. This means that he can imagine the parts moving into different relationships without actually moving the parts. Such manipulation of ideas may, like the manipulation of the parts, result in errors, but the good thinker, in manipulating his ideas, is able to check and verify or reject the results of the manipulation in exactly the same way as in the manipulation of the concrete objects themselves. In other words, trial and error are usually involved in solving any kind of problem which requires creative imagination or thinking, but the person who is capable of manipulating ideas is not encumbered by the necessity of manipulating the substances represented by the idea. This, of course, makes for greater efficiency, since it eliminates much of the awkwardness and difficulty of mechanical manipulation which often stands in the way of the solution of the problem.

An actual problem with which the author was faced some years ago may help to make this clear. The problem arose as a result

of dropping a pair of pliers through a crack in the board steps leading to the porch of his house. The porch was enclosed at the side with lattice work, providing no opening between the porch level and the ground. The pliers were plainly visible through the crack from above or through the openings in the lattice work. Neither of these openings, however, was large enough to permit a hand to reach the pliers. In solving this problem there was considerable manipulation of ideas with only a minimum of significant movements. This manipulation of ideas resulted in the formulation of several possible solutions. Each of these was in turn rejected, at least tentatively, and further search was instituted for other possible solutions until a satisfactory one was hit upon. The first suggested solution was obviously borrowed from closely similar experiences of boyhood, such as dropping a coin into a crack in a sidewalk. This solution would have made it necessary to secure tools and remove one of the boards from the step, but this would have meant defacing the newly painted woodwork. Hence, the tentative rejection of this suggested solution, with the recognition that it would serve as a last resort if other means failed.

The pliers had fallen in such a position that one side of the handle lay free from the ground. The perception of this fact suggested the possibility of slipping a noose on the end of a string over the handle and pulling up the pliers. This solution was rejected without attempting to carry it out because it seemed probable that it would be difficult to make the noose tighten around the handle sufficiently to enable the pliers to be lifted through the narrow crack.

The next suggestion was to allow the pliers to remain there and to replace them with another pair. This seemed to be a satisfactory solution, but by this time the problem itself had become fascinating. Furthermore, the pliers would probably be needed before they could be replaced. Looking over the whole situation again, it was noticed that the ground near the lattice work was unplanted. This suggested the possibility of making a small excavation and slipping a shovel under the lattice work to scoop up the pliers and draw them to the edge, where they could be

secured. This seemed to be the most reasonable solution. Notice that up to this time there had been no effort at actual, overt manipulation of any of the objects involved in the problem situation. The last suggestion was followed and proved satisfactory.

In this particular instance success resulted from the first activity that involved manipulation of a material substance, but there had been considerable manipulation of ideas preceding the verification of the fourth in the succession of suggested solutions. Each manipulation of ideas resulted from a new perception of relationships involving both present sensory data and recalled experiences. Each manipulation resulted in an hypothesis. Then came the significant characteristic of reasoning, i.e., checking and verifying in terms of the present circumstances. If it had been only an imaginary situation, mere invention might have sufficed without checking against the facts in hand.

Rôle of Muscular Response in Thinking—an Explanation of "Mind Reading."—Careful observation of one's own thinking or that of others indicates that some muscular responses are present even when the thinker is totally unaware of them. The muscles most involved are those of the speech apparatus. Hence, thinking has sometimes been defined as a process of sub-vocal speech. Other kinds of muscular responses are often also involved, such as gesture and posture, and emotional responses involving flushing and blanching of the skin and changes in rates of respiration.

It is interesting to note, in connection with these observations, that the process of "mind reading," so far as it has any demonstrable basis, consists of the appropriate interpretation of these slight responses. Some persons become skilled in such perception and consequently are enabled to make very practical guesses as to what another person is thinking. This is especially true in cases where the "mind reader" is very familiar with the person whose "mind" is being read.

The story is told of a certain professional showman who made a specialty of this sort of thing and used his performance for advertising purposes. It was in the days of the horse and buggy. The "mind reader" asked a locally selected committee to take a

certain object and, driving by any route they pleased, hide it in a spot of their own choosing. In the meantime he remained blindfolded, closely guarded by the watching crowd. When the committee returned, the showman took the driver's seat, still blindfolded, and drove the team, sometimes at a full gallop, over the exact route followed by the committee. His only request was that one of the members of the committee should sit in the front seat with him, keep his hand on the left wrist of the driver, and stop him if he were about to run over anyone. Arriving at the spot, he dismounted from the buggy, still accompanied by the committeeman with his hand on the showman's wrist, went to the lumber pile where the object was hidden, and promptly removed it, much to the amazement of the committee. Here, surely, was a wonderful exhibition of mind reading. The committeeman, riding in the front seat with the blindfolded driver, had unintentionally given him slight muscular clues which enabled the trained "mind reader" to accomplish his task. Much the same kind of explanation can be applied to the many interesting ways in which one person often elusively but effectively modifies the behavior of those about him, sometimes without awareness on the part of the others of the nature of the stimuli which have controlled their behavior.

Other interesting facts concerning the rôle of muscular response in thinking have been evolved from experimental studies such as those of Jacobson,[1] who developed techniques for teaching individuals to relax. He found that in states of almost complete relaxation thinking activities were greatly reduced and the affective or emotional aspects of behavior considerably minimized. Certainly, common observation would seem to verify the fact that a person in process of solving a problem is decidedly active, at least to the extent that he experiences an unusual degree of muscular tenseness. He may be sitting quietly and may appear to be comfortably relaxed; nevertheless, there is a vast difference in the very posture and appearance of the person who is actively thinking and one who is merely sitting and resting. An experi-

[1] Edmund Jacobson, *Progressive Relaxation,* Chicago, University of Chicago Press, 1929.

enced professor has no difficulty in singling out in his classroom those students who are actively engaged in some kind of thoughtful activity. Of course, it does not necessarily follow that the listener is thinking about what the speaker is saying, but, whatever his thoughts may be, the student who is thinking behaves differently from the one who is merely sitting quietly in the presence of the speaker.

Intuitions, Hunches, and Premonitions.—The processes involved in intuition are, with some exceptions, the same as those involved in reasoning. The good reasoner takes care to verify each hypothesis before accepting or rejecting it. In intuition, this process of verification is either reduced to a minimum or is absent altogether. Another difference is often, but not always, present. In the process called reasoning, the reasoner is likely to be aware of the stimuli to which the response is made. In intuition, the stimuli are often subtle and sometimes masked by other facts.

The latter difference is even more evident in the responses that are called "hunches." One sometimes hears it said, "I have a hunch that Fred is coming over tonight." What the person really means is that there is a pretty good chance that Fred will come, but that the actual evidences of the prospect of his coming have not been carefully examined. Consequently, the hypothesis is not verified. It is also important to remember that hunches and premonitions are rather more likely than not to be evident in situations involving frequently recurring acts. Really, then, there is nothing mysterious about these phenomena. Roughly they resemble reasoning, but they usually represent an inadequate and faulty type of reasoning. That they so frequently seem to be correct is due to the fact that they occur in habitual situations. Moreover, it is easy to remember the cases where the hunches have been right and correspondingly easy to forget those that have turned out to be wrong.

Abstracting and Generalizing.—In several respects, these two types of behavior closely resemble certain aspects of thinking. Abstracting is the "drawing out" of a particular element of ex-

perience because of its significance and uniqueness. Nothing is ever abstracted as a unique element of experience if it occurs always with the same accompanying elements.

An illustration from childhood concerns the abstraction of the element of "orangeness" from the many groups of spherical objects of many sizes and colors. The child's actual perception of an object can be determined only by his complete response to the object. This includes not only his verbal behavior but also reaching, handling, and manipulating. One very young child called any spherical object a "wow," apparently a generic name for all such objects as apples, oranges, rattles, and balls. It was soon noticed, however, that this name was applied only to yellow or orange-colored objects. Still later the name "wow" was applied only to oranges, the child having learned to discriminate between an orange and other objects of the same general size, shape, and color. This name persisted for months and was obviously the child's original effort at pronouncing the word "orange." Clearly this is evidence of the fact that the child abstracted the concept of orangeness first from sphericalness, then from sphericalness and color, and finally from sphericalness, color, and other characteristics by which oranges differed from other objects of his experience.

Abstraction has been discussed before giving thought to generalization, because generalization cannot take place until some degree of abstraction has preceded it. What happens in actual life situations is that the generalizations develop simultaneously with the continuing process of abstraction. Generalization may be defined as the discovery of a general truth which governs two or more specific situations, with the implication that this general truth will also apply in new situations as they arise. In its highest form generalization involves a very large number of specific situations. Any rule or definition is a generalization. Thus, "a noun is the name of a person, place, or thing" and "objects in space are attracted to each other in direct proportion to their masses and inversely in proportion to the distance between them" are generalizations which have grown out of experience with many situations. In order to be able to formulate abstractions

and generalizations, it is necessary that the investigator experience the element to be abstracted or the principle to be generalized in a variety of situations. Thus, if "dogness" and "animalness" always accompany each other, no abstraction of one of these elements from the other can take place. And in order to develop the rule of grammar just cited as a meaningful generalization of his own, it is necessary for the learner to experience a variety of situations from which this principle may be abstracted and generalized. It is worthy of note that when one has discovered the essential element in an abstraction, it does more than merely add to all the other elements already perceived; it adds new meaning to the whole situation. This enlargement of meaning is the essential basis of generalization.

An Outline Summary

1. Perceptions.
    A. The characteristics of perception:
        (a) Perception literally means to "see into"; synonyms are insight, recognition, and understanding.
        (b) The perceptual response consists essentially of the organization of the stimulation present to the senses, in terms of previous experience.
        (c) Perception may involve any one kind of sensory experience or a combination of several.
    B. Illusions:
        (a) A perception that differs materially from the usually accepted organization of any group of stimuli is called an illusion.

2. Imagery.
    A. Characteristics of imagery:
        (a) An image consists essentially of a minimal reproduction of a former response, particularly of a former perception, in the absence of the concrete stimuli for the previous response.
        (b) In imagery several or many previous experiences may be employed in a variety of new combinations.

B. Imagination:
   (a) Imagination consists of the organization of previous experiences into new patterns in such a manner that the newness of the pattern may conceal the essential nature of the original responses.

3. Reasoning.
   A. Characteristics of reasoning:
      (a) Reasoning resembles imagination in that it employs old experiences in new patterns.
      (b) It differs from imagination in that reasoning employs a much greater degree of control in checking the resulting new organization against other experiences.
   B. Intuitions, hunches, and premonitions:
      (a) These all resemble reasoning except that the person responding is much less aware of the experiences; hence the control is less rigid.

4. Abstraction and generalization.
   A. Abstraction:
      (a) Is the result of discovering a common element in many different situations.
      (b) The abstraction is often a response to a quality or a relationship that does not exist in a material form.
   B. Generalization:
      (a) Is the result of the discovery of a general governing principle from several or many different situations with at least an implied extension of the discovered principle to similar situations not yet experienced.

Problems for Further Thought

1. Recall an experience involving an illusion such as mistaking a bush for a human figure. Write down as much of the detail of the whole situation and mind-set as you can recall. Do these circumstances help to explain the nature of the activity? In what way? Could you regain the illusion when the mind-set was different? Explain.

2. After reading this chapter through once, how successfully can you *organize* the whole chapter in terms of the main points discussed without looking through it again? Can you go so far as to phrase the most important subtopics under the main topic headings? Try it and compare your results with those of others in the class and with the outline summary. How successful have you been? What does this suggest in terms of the development of perception?

3. Ask the instructor for a simple mechanical puzzle, or work out a crossword puzzle, noting the processes of thought activity mentioned in this chapter. A jigsaw puzzle is very useful here. Note how different individuals differ in their ability to select the right piece from the many on the board. Note, too, the cues you use to check the results of your attempts to solve each part of the problem.

4. Why do readers often find the illustrations of a piece of fiction so annoying? One often hears the remark in such a case: "That isn't at all the way I had it pictured." Explain.

5. How can you account for the illusions of movement in certain neon signs when in reality there is no actual movement of the light from one part of the field to another.

6. Select three articles or short chapters from three books representing easy, moderate, and very difficult reading material. Read each through once and then write out the essential ideas of each selection. Check the articles again for content and compare with your written report. Note how important a part organization plays, especially in the more difficult selections.

7. Without warning the subject of this experiment about the nature or purpose of it, get some friend to visualize for himself while you slowly read to him the following description. Better yet, have someone else do the reading so that your attention will be entirely directed to discovering subtle movements of which the person doing the visualizing may be entirely unaware.

"Imagine yourself seated on the ground after dark in front of an open campfire. The fire is rather small so that you are sitting close to it. You reach out with a stick and poke up the fire so that a cloud of sparks sails off into the darkness of the night. See how they soar away, some of them going directly upwards for a great distance in the still night air."

As you have watched the person while this description was being read, have you been able to observe any evidence of muscular movements? These may take the form of slight eye movements, usually

upward, slight inclination of the head in an upward direction, or possibly even the general but slight tendency on the part of the individual to lean backward as if watching these sparks flying away at a great height almost directly overhead. Make a record of these responses and compare your results with those of others in the class.

Suggested Readings

Arlitt, Ada H. Psychology of Infancy and Early Childhood. 2nd ed., New York, McGraw-Hill Book Co., Inc., 1930. Ch. IX, "Sensation and Perception," pp. 206–255.

Curti, Margaret W. Child Psychology. New York, Longmans, Green & Co., 1930. Ch. IX, "The Organization of Meaning in Thinking and Reasoning," pp. 251–286. The preceding two chapters dealing with the origin and growth of meanings are useful also.

Franz, S. I., and Gordon, Kate. Psychology. New York, McGraw-Hill Book Co., Inc., 1933. Ch. X, "Perception," pp. 341–383. This reference is very rich in illustrative material.

Gilliland, A. R.; Morgan, J. J. B.; and Stevens, S. N. General Psychology. Boston, D. C. Heath & Co., 1935. Ch. VI, "Perception," pp. 172–206. Also contains much good illustrative material.

Murphy, Gardner. A Briefer General Psychology. New York, Harper & Bros., 1935. Ch. XVI, "Thought," pp. 314–342; Ch. XVII, "Imagining, Dreaming, Inventing," pp. 343–363.

Chapter 11

SOME OF MAN'S WAYS OF BEHAVING AS A PART OF A SOCIAL GROUP

Nature of Social Behavior.—In Chapter 1 it was pointed out that psychology is closely related to sociology in that sociology is primarily interested in the nature and functioning of the social group and social institutions while psychology is interested in the behavior of man within these social groups and institutions. The connecting link between sociology and psychology is sometimes called social psychology. This branch of psychology deals with the characteristics of man's behavior toward his fellow men.

Everything in man's environment, both animate and inanimate, has a stimulating effect upon him, but the particular kind of stimulation that he receives from the presence of other human beings is of special importance to him. It involves an interaction that is usually lacking in other kinds of stimulation.

A similar phenomenon can be observed among those lower animals that form social groups. Some animals have characteristics of behavior that are distinctly social in the human sense of the word. Notice, for example, the communal activities of insects, or the cooperative social activity of some of the higher forms of animal life. Man's social life is far more complex and extends into many varied fields of behavior. This greater complexity can be attributed in part to the very long period of human infancy. The long period of dependence and development in close contact with the highly organized life of his elders provides for the human infant a very extensive period of social conditioning. Many of these socially conditioned habit patterns persist through later life.

In order that the child may survive and be able to get along with the older members of the group, it is necessary for him to learn certain modes of behavior. The human being has many pos-

sible ways of reacting to any situation, and the young person may develop any one of a variety of habits of meeting his difficulties. The particular habits that are thus developed tend to persist, as do all habits, although this does not imply that later modifications are impossible.

Socially established habits tend to control behavior even in the apparent absence of the social situations in which they were learned. This is illustrated by the habits that are sometimes called morals. One who has been thoroughly habituated to honest behavior can be depended upon to behave honestly even when there is no probability that dishonest practices would be detected. The persistence of habits under such circumstances insures the continuance of a well-established behavior pattern.

The governing factor in such a situation is sometimes called *"conscience."* One is frequently told to "Let conscience be your guide." But what is conscience? Is it anything other than certain habits of acting and thinking about certain social situations that have been established within the individual? This may not be all that is involved in the concept of conscience, but habit certainly plays an important rôle in it. These habits usually become fixed in the early years of life, and thereafter remain as a powerful guiding and controlling influence upon behavior.

Complexity of Social Behavior.—The social behavior of any human being is very complex and difficult to analyze. Not the least important reason for this is the very complexity of the *social inter-stimulation* of all the members of the group of which he is a part. In order to understand the social behavior of the individual, it must be studied as part of the behavior of the whole group. Slight changes in the behavior of other members of the group may have an important effect upon the behavior of the one being studied.

The complexity of the human organism and the wide range of possibilities in the response of any one person to a given situation make prediction of social behavior extremely difficult. A sudden loud noise, for example, may cause different individuals to react in very different ways. One may flee in panic, another

may simply stand and tremble, while a third may strike out violently at those around him.

Previous experience is another important factor in social behavior, but since this previous social experience has invariably been complex it is almost impossible to know which part of a person's experience will predominantly influence the present response.

Because it is so very difficult to analyze, social behavior has, in the past, been often attributed to other than natural forces. Such an attitude destroys all possibility of understanding, predicting, and controlling such behavior. To avoid so erroneous an attitude, it is necessary to examine an important means of inter-stimulation within the social group; namely, communication.

Rôle of Communication in Social Stimulation and Response. —Communication in the form of language, gesture, facial expression, and posture plays two important rôles in social inter-stimulation—that of producing desired responses in others, which is the real communicative rôle of language, and that of bringing about a change in one's own behavior.

Language is a series of habits employing certain symbols whose meanings are determined by the common social experience of those employing them. Human beings are equipped with a speech apparatus and a controlling nervous system which, within certain limits, is the same for everyone. The experiences to which different individuals are subjected will determine the need for the acquisition of any particular set of language symbols. This applies not only to the learning of different languages but also to the development of different vocabularies within the same language. It is not unusual for young children to invent language symbols to represent some idea, but these are normally soon forgotten. Idioms and other peculiarities of speech acquired in early childhood often persist throughout life, even when the individual is transposed to a different social group with different norms of speech behavior. The social significance of language is evident in the language changes which children display while

maturing. At different stages of development, these language changes correspond to changes in the social nature of the developing child.

When the child first begins to employ language, the vocalizations probably have no deeper significance than do other random movements of the body. These sounds of early infancy acquire meaning as a result of the interplay of behavior between the child and his family, but it has been shown by experimentation that the child makes the sounds before the adult meaning is attached to them. Situations similar to this recur in some degree throughout life.

The development of language is a means of becoming socialized. At the same time, it provides a means of controlling the behavior of others. These two factors together represent the essence of socialization which is, after all, only the interaction of the individuals comprising a social group. Without language, socialization would be largely impossible, since communication would then be limited to gestures and movements of much the same order as those employed by some of the lower animals.

However, certain gestures and movements of parts of the body have come to have meaning as standardized symbolic representations of ideas, and they pass for the equivalent of speech in ordinary social life. Among the most obvious of these are the shakings of the head in negation and affirmation. Other instances are beckoning with the hand or head, pointing with the finger, or directing the gaze toward a point for the purpose of attracting the attention of another to that point.

There are still other individual characteristics of behavior which are not quite so universally used. These range from bodily posture and facial expressions, which are fairly common, to individual mannerisms which can be interpreted only by those of the group who are thoroughly familiar with the idea represented by the gesture.

Imitation—The Similarity of Stimulus and Response.—Certain similarities of behavior, such as are always found among the

members of any large social group, have frequently been described under the heading of imitation. The most commonly accepted layman's concept of imitation implies that human beings have a capacity to behave like each other that cannot be explained in terms of natural phenomena. This is unfortunate, and indicates that a better explanation of imitative behavior is needed. In imitative behavior the response of one individual is not only similar to that of another, but normally results from the similarity of stimulation of both. Suppose that a number of men are standing on a street corner gazing at the cornice of a many-storied building. The very fact that many are doing the same thing is often said to be an example of imitation. But, as one continues to observe this group, it will probably be noticed that other persons approach and begin to behave in a like manner. This can mean only that imitative behavior not only resembles the behavior of others, but also acts as a stimulus in calling forth like behavior.

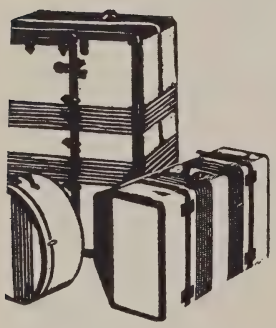
Such an interpretation does no violence to principles of scientific explanation. The similarity of structure and the similarity of the learning experiences of human beings is sufficient to explain the phenomena of imitation. All the members of the sidewalk group have, as human beings, similar bodily structure. Previous experience has taught each of them that whatever is attractive to a group of human beings will probably be attractive to him, and the very fact that all those present are doing the same thing increases the probability that the object of their attention will be interesting to the newcomer. Imitation, then, might be described as suggestion. The behavior of a group suggests a particular kind of activity to the newcomer and this suggestion acts as a stimulus to similar behavior on his own part.

Social Significance of Imitation.—There is a special social significance in doing and being like others. Eagerness to conform to the social mode is a strongly enforced result of the processes of social conditioning. One learns to be and to act like the other members of one's group in order to avoid the unpleasant consequences of the disapproval of the group.

Although different families provide their members with different kinds of early childhood experiences, certain fundamental similarities and even identities nevertheless exist. Nearly all children are raised in a family situation in which their well-being and continued happiness depend upon their conforming to certain modes of behavior established by the family. For example, about one-third of the world's population habitually use knives, forks, and spoons in eating; another third use chopsticks in place of the fork and spoon; and approximately the remaining third still use fingers as a means of conveying food to the mouth. For the child who is raised in a family under social conditions where forks and spoons or chopsticks are regarded as the appropriate implements of eating, using the fingers will result in disapproval by the family group. Consequently, the child adopts his family's customs. Eventually such behavior develops as a habit to the point where it becomes extremely distasteful to be obliged to dispense with such implements. For the child who is raised under family conditions under which fingers alone are employed for the conveyance of food, an entirely different set of habits is developed. It can thus be seen that experience is an important factor in determining the mode of behavior employed by a whole group.

Social customs, modes of dress, methods of salutation, and, in general, habits involved in social intercourse develop for the individuals of the group in proportion as common social pressures are brought to bear upon all members of that group. This concept can be extended further to include superstitions and beliefs. As societies and civilizations become more complex, the social pressure brought to bear upon its members becomes more and more varied. In general, it is probably true that the more primitive the society the more unvariably alike are the behavior patterns of the members of the group.

Suggestion—an Elementary Process of Social Control.—Essentially, suggestion is a matter of stimulation. The particular kind of stimulation called suggestion implies that the person is being stimulated indirectly. This indirectness may vary considerably in degree. It may be carried to such an extreme that the



Don't blame this poor camel for putting on airs"... Oshkosh luggage seems to have that effect on man or beast.

* * *

Nowadays most people who take wardrobe trunks like them big. The Oshkosh "Chief" at left has 16 hangers plus a completely organized drawer section and costs $200. Round hat box for women, $32.50. The third piece with leather straps is a large carry-all case with tray, surprising in capacity albeit light in weight. $55.

OSHKOSH

TRUNKS AND LUGGAGE

OSHKOSH TRUNKS, INC. 40 EAST 49TH STREET, NEW YORK

THE SUGGESTION OF SUPERIORITY

(By permission, from *The New Yorker*, June 26, 1937.)

person being stimulated is not at all aware of the stimulus controlling his behavior. It is important to remember that, however indirectly it may be applied, suggestion is still a process of stimulation.

The psychology of advertising is largely the application of principles involved in the concept of suggestion. Many a purchaser comes to accept and believe certain statements because they are presented frequently in a variety of advertising media. A number of years ago, when a certain brand of cigarettes was selling at a slightly higher price than other brands, the advertising of that brand was centered around the slogan, "What a whale of a difference a few cents makes." Many persons actually believed that there was such a "whale of a difference." With at least one smoker this belief persisted even after he had been unable, while blindfolded, to tell the difference between the cigarettes from his own package and those from packages of several other varieties. In this case, the repeated suggestion that there was a difference had come to be accepted as so patent a fact that even the evidence of a new experience had little effect on his firmly established belief.

A well-known food product had for years been advertised under the slogan, "None genuine without this signature." In reality, the actual food value and desirability of that particular food product was not even mentioned directly in this slogan. But the implication was that a food product of a similar sort that did not come in a package bearing this signature would be inferior. The implication was so strong that this line of advertising was continued for years. What the advertiser had succeeded in doing was to suggest to the purchaser that genuineness and desirableness meant the same thing. Genuineness in this particular case referred only to the fact that the product was manufactured by one particular firm.

One of the most noted examples of suggestion in advertising was employed in recent years by a cigarette manufacturing company, until it was compelled by court action to modify its line of advertising. The effectiveness of this particular slogan depended upon the national fad of feminine slimness prevailing at the time.

It read: "Reach for a —— instead of a sweet." This slogan was often accompanied by another slogan, "Coming events cast their shadows before." The latter suggestion was usually illustrated by the representation of either a masculine or feminine figure (more often the latter) of a most desirable youthful trimness and slimness, casting a shadow which could only be made by an unfashionably rotund person. The implication, in this advertising, was very definitely that the use of this particular brand of cigarettes would make one slimmer or enable one to retain one's slimness. Actually, nothing to that effect was said, but in this case the suggestion was so direct as in the opinion of the court to be the equivalent of an actual statement of fact.

It is not only in the matter of the market that suggestion is of social importance. It is significant also in a variety of other social situations. The dietitian in a hospital must be ever-conscious of the desirability of suggesting hunger to the patient by means of good food, attractively prepared. Crosses erected on the highway at points where fatal accidents have occurred suggest to the passing driver the desirability of caution. Wearing apparel is frequently designed to suggest certain personality traits.

Probably the most outstanding examples of wholesale or mass suggestion are to be found in the old-fashioned religious revivals, political rallies, mob actions, and similar social gatherings. Here, of course, we have instance of the repeated reenforcement already discussed under the heading of imitation. But there is a forceful suggestion in seeing someone else "hitting the sawdust trail" during a revival meeting that can have a profound effect upon those members of the congregation who are a bit undecided. A skilled revivalist knows this and therefore places certain of his assistants at strategic points in the audience so that at the appropriate moment, upon urgent invitation of the speaker, they can come forward. Their action in going forward becomes a powerful suggestion and oftentimes may be the deciding factor in provoking the response desired by the revivalist. The political or collegiate rally has much the same character. The leader in charge attempts to evoke an enthusiasm in certain persons in the

crowd, because such a response frequently acts as a suggestion which may be all that is necessary to bring about similar activity on the part of the entire group.

Hypnosis is a phase of suggestion. The most outstanding characteristic of the behavior of a person who has been hypnotized is that he becomes more suggestible within a narrow range. At the same time, he becomes almost completely non-suggestible to stimulations by anyone other than the hypnotist. It might be said that hypnosis is essentially a process of narrowing the range of normal stimulation so that the field includes only the hypnotist. His commands and suggestions are then carried out completely by the one who has been hypnotized. However, there are limits to the suggestibility of any hypnotized person. The evidence points to the fact that the one hypnotized cannot be induced while in the hypnotic state to follow suggestions which are strongly contrary to his previously well-established habits. The good showman keeps this in mind and in producing his bizarre results on the stage, carefully avoids suggesting to his hypnotized subject a type of behavior against which strong inhibitory habits have been established. There is, therefore, nothing particularly startling about hypnosis, many of the beliefs about it being entirely unfounded. The subject must cooperate by following the directions of the hypnotist.

Not all hypnotists are equally successful in getting their subjects to respond to their suggestions, and some persons are less suggestible than others, since they are much keener in their perception of the hidden implications involved in the suggestion. The extremely non-suggestible person is sometimes called negativistic. Such a one, instead of responding positively to the suggestion, behaves in a very contrary manner. This tendency toward negativism may be advantageously employed by the person who is aware of this tendency in human behavior. The well-known story of Tom Sawyer getting the fence whitewashed is an excellent example of this fact.

Social Inter-Stimulation Within the Group.—There are other ways in which the individual, when in the presence of his

fellows, is stimulated to a different kind of behavior than would result if he were alone. The young college man who on a warm summer day proudly wears a heavy sweater bearing an athletic emblem is probably trying, through such behavior, to attract the attention of others in his group.

Rivalry is also recognized as an important factor of social control. This may involve competition with other persons or the checking of oneself against certain objective standards. It is a well-known fact that in track events the conference and national records are achieved on the basis of rivalry. The absence of a rival has a decided effect in lessening the quality of the performance. This is particularly true of motor performances, but it is also evident in such mental activity as imagination and problem solving.

Participation in the activities of face-to-face situations, such as committee meetings, is largely a matter of adjustment between individual ascendance and submission. If the committee is composed of those of approximately equal tendencies toward dominance, the discussion is largely a give-and-take affair. Where such activity does not result in a clear agreement, a compromise is almost sure to result. In such a group the influence of each committee member upon the others is clearly seen. In some committees, however, the tendency toward dominance is not equally distributed. Often one member is the dominant influence in the group. In such a situation the discussion will still be based on general inter-stimulation, but because there is one dominant pole around which the activity of the others tends to center the conclusion reached by the group will usually be colored in large measure by the opinions of the ascendant personality.

In any event, group activity has a stimulating effect upon the thinking of all the members of a discussion group, even when one personality dominates. The thinking of each participant is significantly influenced by any activity on the part of other members of the group. The necessity of convincing others tends to stimulate thinking and imagination, for when one is confronted with listeners it is necessary to consider the effect of one's ideas upon these listeners. They may not even be actually present, as in

the case of the one who expresses himself in writing, but the results tend to be essentially the same. The most effective creative imagination and thinking is that which is done with listeners of some sort in mind.

When the Group Gets Larger—The Audience and the Mob. —A crowd is defined by Allport as "a collection of individuals who are all attending and reacting to some common object, their reaction being of a simple, prepotent sort and accompanied by strong emotional responses." [1] A large college class attending a lecture differs markedly from a mob of strikers, but the difference is almost entirely one of the degree of emotional response.

The crowd differs from the face-to-face group in several important respects, and resembles it in others. It resembles it chiefly in that the behavior of each individual is affected to some extent by that of his fellows in the crowd. This is true even in a college class. It has been shown from experimental studies that students near the center of the class are more actively stimulated by those around them and attain a higher average standing than students who are at the fringe of the class. This difference is due to group inter-stimulation rather than to differences in the way in which the various parts of the class are stimulated by the speaker. The same sort of thing can be observed in large revival groups or in crowds gathered to witness a spectacle such as a ball game. The individuals tend to lose some of their identity in being members of the crowd. This is true chiefly in the sense that all are tending to stimulate each other to a similar kind of behavior.

An interesting example of the emotional reenforcement produced by crowd activity is furnished by an incident that occurred on the first anniversary of the signing of the Armistice that ended the World War. It happened in a small Western city, a few miles distant from the scene of an Armistice day riot in which several ex-service men in uniform had been killed at the hands of a labor organization. As the news of this incident reached the city, the ex-service men congregated in their clubhouse. Here was a crowd in the complete sense of Allport's definition. All were reacting

[1] F. H. Allport, *Social Psychology,* Boston, Houghton Mifflin Co., 1924, p. 292.

directly, and with considerable emotional reenforcement, to the death of other ex-service men at the hands of what was regarded as an un-American organization. While emotions were running high someone suggested a parade. The idea was immediately adopted. The American flag and other banners were brought out and carried at the head of a column of men who proceeded to march through that portion of the local community which was inhabited mostly by members of the opposing group. A few minutes of brisk marching served to cool the ardor of all but the most fiery spirits. However, as they were returning to the hall, one of the marchers noticed that a bystander did not doff his hat as the flag was carried by. He first called from the marching ranks commanding the man to take off his hat. It is possible that the man, who was a foreigner, did not understand the command. In any event, he did not take off his hat. Thereupon the ex-soldier proceeded to the sidewalk and forcibly removed it. Fortunately, the man thus accosted offered no resistance. Had he done so, violent mob action might have resulted.

All the general characteristics of crowd activity were brought into play in this incident: (1) the simplicity and directness of behavior, (2) the similarity of the behavior of all in the crowd, and (3) the emotional reenforcement resulting from inter-stimulation within the group as the members individually react both to the common source of stimulation and to each other. The tendency of the individual to lose his identity in the mass activity of the group as a whole is also seen here. "Shorty had his gang with him," was the remark that was made in referring to the incident a week later. Shorty was no coward under any circumstances, but it is extremely improbable that he would single-handed have accosted this bystander who was physically more imposing in appearance than Shorty himself.

It has frequently been remarked that the emotions manifested in crowd activity are most often of the "primitive survival-value" type. The tendency for the more civilized and more highly moral activities to disappear in a crowd situation is probably due to the fact that none of the learned inhibitions which function habitually in everyday life can withstand the force of the intensive inter-

stimulation of those within the group. The "mob mind" is only a convenient figure of speech, and the individuals in a crowd are still behaving in accordance with their individually acquired habits or inherited dispositions. All that the crowd situation does is to provide a strong stimulus for a kind of behavior which would normally be inhibited.

During the World War the whole American public became a crowd and almost a mob. People said and did and believed things which they now blush to recall. Independence of thought and action was virtually impossible. Anyone who dared to express himself by word or action in terms of the usual habits of average American conservatism was actually in danger of mob violence, at times, and of social disapproval always.

Each person within the crowd tends to multiply by his own reaction the effect of the stimulation received from some focal point, for example, from the leader. He does this because the members of the crowd are acted upon, through suggestion, by at least those with whom they come personally into contact. The leader's commands and entreaties become magnified through the action of the listeners, so that each one of them is affected not only by the leader himself but also by the suggestive effect of the behavior of those surrounding him.

Social Attitudes and Social Consciousness.—An attitude may be defined as an emotionally reenforced habitual pattern of behavior usually affecting the person as a whole and evoked by a specific kind of life situation. Not all attitudes can properly be regarded as social, but we are particularly concerned here with those that involve social situations. Attitudes change as one takes part in the activities of different groups. The old adage, "When in Rome do as the Romans do," is an admonition which is often both consciously and unconsciously adopted in going from one social group to another. In this sense a person may be said to have several social personalities which sometimes are so distinctly different that acquaintances from different social groups have opposing opinions of the individual's personality. Many a business man is known to have an attitude of brusque-

ness with his business associates but is kindness personified in his home. On the other hand, the reverse of this is sometimes evident.

These attitudes have a rather important effect upon both oneself and one's associates. Habits of any sort enable one to meet familiar situations with a minimum of effort. An attitude toward a particular kind of social situation enables one to adjust to that situation readily and with a minimum of conscious attention. Success in adjusting to a social group frequently depends in part upon creating a satisfactory impression upon the group. It is oftentimes more important to be impressive than to be logical, since being impressive may modify the behavior of others in a way that being logical sometimes fails to do. Being impressive may be accomplished in terms of manners of dress and speech, mannerisms of posture and gesture, breadth or apparent breadth of information, and by other similar means.

One often fails to analyze specifically many of his social attitudes. Such analysis is important only in so far as it makes possible the modification of an attitude to meet the requirements of the social situation. Many of the most useful social attitudes have become so habitual that they are no longer a part of consciousness, although they are definitely parts of personality. There are situations, however, in which one may become socially conscious of his rôle in the group. Social consciousness might be defined as awareness of one's attitude toward his social group and his feeling of belonging to it. In the latter respect the individual becomes a member of the crowd and to some extent loses his identity and individuality.

Another characteristic of social consciousness is awareness of the value of behaving like the group, and for the good of the group. This is a significant part of the social consciousness of fraternity and sorority membership. It does not necessarily imply that the identity of the member is lost or completely submerged in that of the group, but it does presuppose awareness of the value and the importance of behaving in the approved group manner even though it should involve some individual loss of identity.

The importance to the child of the consciousness of being recognized as a part of his own family and school group can hardly be exaggerated. It is often characteristic of a young child when punished to imagine himself not a member of that family, but someone who has been taken into it by mistake. Similarly, the consciousness of being a member of a particular class in school is oftentimes of great importance to the pupil. One of the most extreme forms of punishment that a teacher can employ is to create a situation that causes the rest of the class to shun or avoid one of its members. Children on a playground sometimes do this spontaneously as a result of incidents outside the knowledge of the teacher.

One of the things that will probably always make war and military duty bearable, if not actually popular, is the opportunity it affords for experiencing the social consciousness of being part of a very large group. There is no denying the thrill that comes to the trained soldier in any large review or mass movement of troops under a single command. Several writers have mentioned the element of unity that seems to be recognized in the regular retreat formation which is a part of the military ceremonies at the close of the day's activities. Much the same sort of thing is experienced by the soldier in any kind of military enterprise, and the reason for it is essentially that these enterprises are group activities. The group may vary from a squad to an army, but the soldier who is part of it can hardly escape a social consciousness of belonging to a closely unified group. It is this satisfaction that makes bearable many of the distressing, annoying, or even disgusting features of military duty.

Finally, there is the social consciousness of being a member of a particular race or nationality. To a certain extent one loses ones' identity as a member of the large racial group, and only to the extent that there is a merging of the individual's identity with that of the others is it possible to develop a social consciousness of being an integral part of the larger racial group.

It is apparent that, however large or small the social group may be, no matter how it may vary from time to time or place to place, the social attitude of its members depends upon the devel-

opment of the social consciousness within that group. The sense of solidarity, the sense of belonging to the group, adds something of great significance to the individual's sense of security—a security which can be obtained only at the sacrifice of something of the individual's own identity, although the degree of loss of individuality will differ from one type of group situation to another. It is not suggested for a moment that the truly desirable and worthwhile persons in any social group are those who are the least important as individuals. Even in a military organization, the most important are those who stand out as individualities, each possessing a striking personality.

An Outline Summary

1. The characteristics of social behavior.
   - A. Behavior in situations involving other human beings implies a reciprocal element that is absent from other stimulating situations:
     - (a) Human beings react to other human beings in terms of what will the other fellow do.
     - (b) These responses include behavior in which habits are the only trace of the presence of others.
     - (c) This reciprocal element is present in human beings to a much greater extent than in any other species.
   - B. Social behavior is usually very complex:
     - (a) It is usually behavior that has its basis of habit in very many previous and somewhat different social situations.
     - (b) It may even be the reaction to a complex abstraction.
2. The nature of communication in social behavior.
   - A. Communication may take many different forms, such as:
     - (a) Speech, written and oral,
     - (b) Gesture of hands, shoulders, face, etc., and
     - (c) Posture.
   - B. The origin of the meaning of the symbols employed in communication lies in the social experience common to all those who use them.

3. The rôle of communication in social behavior.
   A. Communication has a dual rôle:
      (a) It results in the modification of the behavior of others.
      (b) It is involved in the changing of the behavior of the speaker (thinking and imagination).

4. The social significance of imitation.
   A. The response resembles the behavior of others and acts as a stimulus for others.
   B. Imitation is a form of social conformity and as such is important for the individual's well-being.

5. Suggestion.
   A. Suggestion is essentially an indirect stimulus in which the one responding usually fails to see the whole significance involved.
   B. It plays an important part in determining behavior in all social situations.
   C. Hypnosis is an extreme degree of hyper-suggestibility within a narrow range and is marked by an uncritical acceptance of the stimulus as presented.

6. Social inter-stimulation.
   A. In the face-to-face situation the interaction is direct and in some degree reciprocal (as in rivalry).
   B. In the audience and the mob the interaction is less direct but the multiplication of the interaction may greatly increase the total stimulation of each member.

7. Social attitudes and social consciousness.
   A. The nature of such responses:
      (a) They are emotionally reenforced responses which have their origin in, and are concerned with, social situations.
      (b) They may change as the individual passes from one group to another.
      (c) They stress the importance of being like the group and of acting for the good of the group.
      (d) They involve giving up some of one's own identity in exchange for identification with the group as a whole.

Problems for Further Thought

1. Try this little experiment on a busy street or on the campus when many people are passing. Stand and stare at a high building, or at the sky at a fixed point; or stoop over and look fixedly at the ground as if watching something of great interest. You need not say a thing, at least after the first two passers-by have joined you. Simply vary your behavior in such a manner as further to stimulate the group as it gathers. Contradict no one and supply no definite information. You will soon have a large group gathered around. It may even be possible for you to slip out of the group and be a spectator from a little distance.

In such a case how do you account for the high degree of interest that these people have shown without knowing what it is that has aroused their responses? How do you account for the similarity of behavior displayed by the many people involved? Does it aid your explanation to call it imitation?

2. Gather a dozen or more advertisements from magazines, preferably those employing a well-known slogan, such as Ivory Soap's "99 $^{44}/_{100}$% pure. It floats." Examine each to see just what is claimed specifically and how much is left to inference supplied by the reader. Do not fail to include some patent-medicine advertisement. Tabulate the results of your analysis in three columns. In the first put the slogan or statement from the advertisement; in the second, the actual statement of reasonably substantiated facts; and in the third, the implied fact or facts. Below is illustrated this treatment of the slogan quoted above.

Statement	Stated Facts	Implications Not Specifically Stated
"99 $^{44}/_{100}$% pure. It floats."	This soap floats	Floating is related to purity—hence this soap is highly desirable.

3. Visit an old-fashioned revival meeting or a football rally and observe the techniques employed by those in charge to secure the desired responses of the members of the group. Record your observations. Were chance factors relied upon to secure the desired results or did the leader show evidences of having planned to obtain these results?

4. A number of years ago a woman was not well dressed unless she wore shoes that came well above the ankles. Now it would be difficult to find such a pair of shoes outside the antique shops. The style began with shoes of a moderate height. It soon got to a point where the stylishness of the shoe was largely measured by its height. More recently it has become the proper thing for young men, particularly on college campuses, to disdain hats and caps. How do you account for the appearance and change of men's and women's styles? Indicate the place, in such a development, of the factors of imitation and suggestion and inter-stimulation within the group.

5. During the closing days of the war, when trench fighting was largely over, a platoon commander of infantry on the Western Front reported the following incident. His platoon had found the going easier than expected and had advanced beyond the units on either flank, which had been completely halted. His platoon was in a hot spot, receiving fire from both flanks as well as from the front. His company commander ordered him to bring his platoon back several hundred yards across an open, bare, unprotected hillside. As soon as the retirement began, it became difficult to prevent it from becoming a flight. In fact, when about half way back some men got out of control and began to run. This spread to some of the others in the platoon and even to the adjoining organizations. Only by a slight margin was a rout prevented. Making an orderly retreat under a hot fire is recognized by military commanders as one of the most difficult of battle maneuvers. Explain why. In the situation described above enumerate the factors discussed in this and other chapters which are useful in explaining the incident.

6. The following problem is intended to show the wide variations in certain social attitudes existing among members of a relatively homogeneous group. No exact measurements are here intended.

Let each member of the class write out a *very short* statement (not more than one short sentence) which will express his or her belief concerning each of the following social topics and institutions: (Each should be on a separate sheet of paper and should be left unsigned.)

The church	Trial marriage
War	Divorce
The Negro race	The League of Nations
The white race	Prohibition
The yellow race	Social security by legislation

Add other topics of local interest. When as many statements as possible on each of these topics have been secured, divide the group into as many committees as there are topics. Let each committee arrange a list of statements, including all that are notably different. Let the chairman of each committee read these to the whole class, pausing after each one to give the members a chance to indicate either personal agreement or disagreement. Some will be hard to decide, but one reaction or the other should be secured from each person to each item. When all have been read, collect the papers and compare the results in the separate committees. These committees should then have an opportunity to report to the class the general agreement and disagreement shown by the group as a whole.

In this exercise it must be kept clearly in mind that even a majority agreement does not necessarily indicate anything but a similarity of attitude.

Suggested Readings

Allport, F. H. Social Psychology. Boston, Houghton Mifflin Co., 1924. Part II, "Social Behavior." Chs. VII to XV, incl. Some chapter headings will indicate the general nature of the contents of this book. This is one of the few social psychologies written essentially from the point of view of psychology rather than sociology. Ch. VII, "The Nature and Development of Social Behavior"; Ch. VIII and IX, "Social Stimulation"; Ch. X, "Response to Social Stimulation, Elementary Forms"; Ch. XI, "Response to Social Stimulation in the Group"; Ch. XII, "Response to Social Stimulation in the Crowd"; Ch. XIII, "Social Attitudes and Social Consciousness"; Ch. XIV, "Social Adjustments"; Ch. XV, "Social Behavior in Relation to Society."

Bogardus, E. S. Fundamentals of Social Psychology. New York, D. Appleton-Century Co., 1924. Several chapters of this book bear upon the topics of interest here. Among them are: Ch. X, "Communication," pp. 111–123; Ch. XI, "Suggestion," pp. 124–140; Ch. XII, "Imitation," pp. 141–150; and several others. Dr. Bogardus is a sociologist.

Gault, R. H. Social Psychology. New York, Henry Holt & Co., 1923. Ch. VI, "Suggestions and Suggestibility," pp. 122–154; Ch. VII, "The Crowd and Allied Phenomena," pp. 155–178; Ch. VIII, "Convention, Custom and Morale," pp. 179–201.

Kreuger, E. T., and Reckless, W. C. Social Psychology. New York, Longmans, Green & Co., 1931. Chs. X and XI, "The Nature of Attitudes," pp. 237–320.

Young, Kimball. Social Psychology. New York, Alfred A. Knopf, 1930. Ch. XX, "The Behavior of Crowds," pp. 505–521; Ch. XXI, "Crowd Behavior and Personality," pp. 522–536; Ch. XXII, "The Psychology of the Audience," pp. 537–551.

Chapter 12

SOME DIFFERENCES BETWEEN INDIVIDUALS AND BETWEEN TRAITS

Characteristics of Differences Within a Group.—Casual observation is sufficient to convince the most skeptical that all men are not created equal. In this chapter the chief concern will be the extent and nature of these differences, particularly as regards behavior traits.

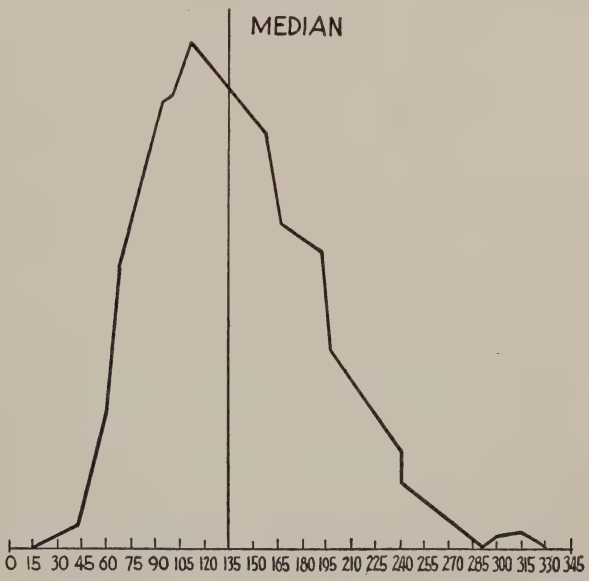


Figure 11. Curve Representing the Distribution of Scores Made by 4,491 High School Seniors on the American Council Psychological Examination

Intelligence is an interesting behavior trait to demonstrate differences among individuals. Figure 11 shows the scores made by 4,491 high school seniors on the American Council Psychological Examination.

The numbers below the base line represent the raw scores made on the test. High school seniors are a selected group. Pupils of low intelligence drop out in large numbers before the senior year. Therefore, the curve does not extend as far in the lower direction as it does toward the upper levels. A few make scores that are very high, but most of the scores are not very far from the median [1] which is shown by the heavy vertical line near the center of the figure. The closer the score approaches the median, the

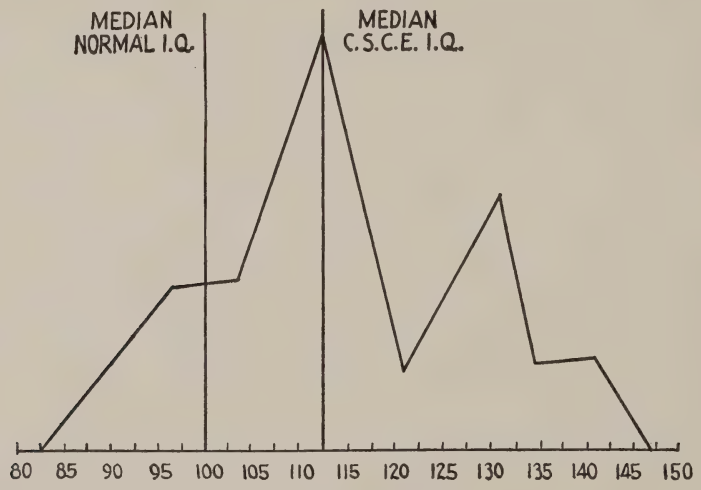


Figure 12. Curve Representing the Intelligence Quotients of a First Grade in the Experimental School of Colorado State College of Education

greater is the number of students with that score; and the farther the individuals deviate from the central tendency, the fewer there are of them.

Figure 12 shows the distribution of intelligence quotients of children entering the first grade. Note that the curve here has about the same general shape as that for college freshmen. These intelligence quotients are from a school charging tuition, which enrolls a rather select group. Hence there is a tendency for the

[1] The median is a point on the scale of scores on either side of which half of the scores will be found.

group to average higher than the usual first grade. The median intelligence quotient here is 112, as compared with about 100 for for the usual first grade.

If any anatomical trait like height or eye color, or a behavior trait like emotionality, motor coordination, or speed of reaction is measured, much the same kind of curve is obtained when the group, in which the measurements are made, is a large, unselected one, and the measuring instrument is reasonably exact. This characteristic shape of the curve is due to the *chance* distribution of the amounts of the trait present in the individuals of the group. Psychologists recognize that even where it is impossible to make

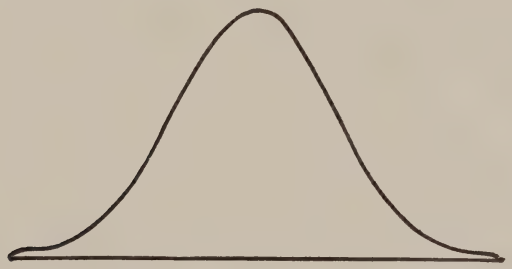


Figure 13. Curve Representing the Theoretical Normal Distribution

exact measurements of a human trait, the results would probably follow this kind of a distribution.

In each of the figures above, or in other similar figures from other series of measurements that might have been used, it will be found that a smoothed curve that most nearly fits the scores obtained would approximate the smooth, bell-shaped figure commonly called the *normal curve* or the *curve of chance*. Figure 13 is such a theoretical curve. An understanding of the significance of this curve as it is related to the distribution of human traits will aid greatly in understanding the problems of individual differences.

Normal Distribution as the Result of Chance.—When a coin is flipped, it is usually said that *chance* determines whether it shall fall heads up or tails up. Some readers may misunderstand this

meaning of the word chance. They may think of the resulting position of the coin as due either to no cause at all or to the intervention of some extranatural or supernatural agency. Things do not happen without some sort of cause, and it is necessary to seek the causative factors within the realm of natural law. A chance event is therefore defined as one which is caused by several factors, each working independently of the others, but all operating simultaneously. Thus, in the case of the coin, the final position will depend among others, upon the following factors: the side of the coin which is uppermost before it is flipped; the way the coin is held; the force and manner with which it is tossed; the relative air resistance offered by the two faces of the coin; and the nature of the surface upon which it alights. These are only a few of the factors involved, but the result is called a chance event.

Now instead of one coin, take six, preferably all alike. Pennies will do nicely. Shuffle them in a small box or a cup and toss them, all six at once, upon a surface such as a rug. It is possible to have six heads up at the same time, or there may be five, four, three, two, one or no heads at all resulting from the throw. Continue this tossing of the six coins until there is a total of 64 throws.[2] Tabulate the number of times that each of the seven possibilities mentioned occurs. From the results a figure can be made like Figure 13, dividing the horizontal line into seven equal parts and using any convenient unit on the vertical scale. The figure resulting may differ somewhat from Figure 13, but they will approximate each other. Any other number of coins could have been used, and any other number of tossings would have been satisfactory. The larger the number of chance factors operating, the larger will be the number of repetitions required for close approximations of the normal curve. Figure 14 was constructed with the results of one series of 64 tossings of six pennies.

It might be well to emphasize two important characteristics of individual differences in the possession of anatomical and be-

[2] This number is used since it is the sum of the exponents when the binomial $(x + y)$ is raised to the sixth power.

havior traits. One of these is the normally wide range between the highest and the lowest scores in the group. Thus, in the first grade group shown in Figure 12, there is considerable difference in the intelligence quotient between the brightest and the dullest pupil. The other characteristic needs only to be restated more specifically. The scores from the measurements within a group tend to cluster around a midpoint and the more any score differs from the midpoint, the fewer such scores there will be. For example, imbeciles are lower in the scale of intelligence than are morons, but there are fewer imbeciles than morons. Similarly,

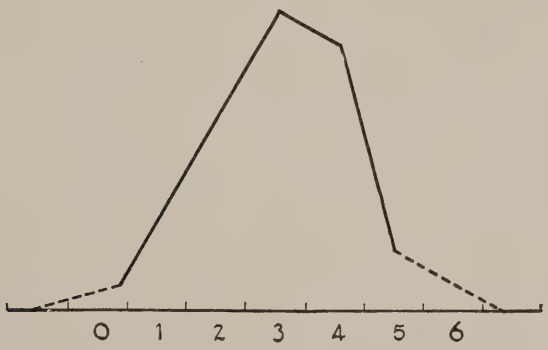


Figure 14. Curve Representing the Results of Tossing Six Coins 64 Times

idiots are still lower in the scale and there are still fewer of these. The same condition exists at the other end of the scale of intelligence and likewise in every scale of differences in human traits.

Convenient Method of Showing Differences Between Two Groups.—For the convenience of later discussion, it will be well to have a means of comparing two separate groups which have been measured by the same scale. Of the several ways of making such comparisons, the simplest is the one called the "percentage of overlapping" method. The name arises from the fact that if a distribution of scores is made for two separate groups for the same trait and on the same coordinates, the result will be two curves which will usually overlap. Figure 15 represents the dis-

tributions of the height of all the men and of all the women in a college freshman class plotted as two separate curves on the same coordinates. The lines M_1 and M_2 designate the median heights

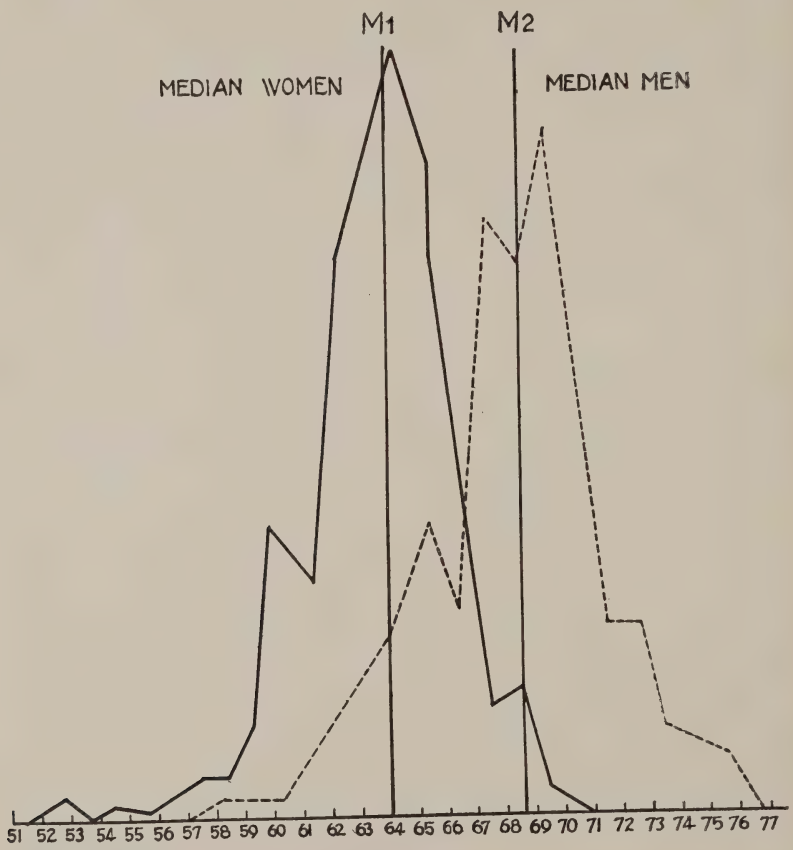


Figure 15. The Distribution of Men and Women of a College Freshman Class on the Basis of Height

of the groups of women and men, respectively. In this case about 4 per cent of the women are as tall as or taller than the man of median height in the group. Therefore, there is an overlapping of the men's group by the women's group of about 4 per cent. If the two medians coincided, 50 per cent would be overlapping.

The Influence of Heredity and Environment Upon Individual Differences

There are several ways of classifying differences among individuals, but we shall confine ourselves to a few of the most significant. We are concerned mostly with behavior differences. It is easy to fall into the error of confusing differences of gross anatomical structure with differences of behavior. In each of the kinds of differences to be discussed here and in the next section, it should be noted that the observable differences of bodily structure are often more conspicuous and more easily measured than are the differences of behavior.

Racial Differences.—There are some very conspicuous differences in anatomical traits between races and, to a less extent, between nationalities. Such traits as skin pigmentation, hair and eye color, facial features, and average height and weight need only be mentioned. However, it is difficult to know when pure racial stocks are involved, and this greatly complicates the problem.

Among the psychological or behavior differences that are sometimes assumed to exist between races are intelligence, emotional characteristics, and sensory acuity. In considering such differences, especially when trying to determine whether they are due to heredity or to environment, it is difficult to be very sure of the reliability of the evidence. One reason for this can be found in the limitations of the present method of measuring most behavior traits. Since there are no fixed units of measurement available in psychology, such as are available to the chemist or physicist, measurements must be made in terms of comparison of the behavior of different individuals. This, it will be recalled, is exactly the procedure employed in measuring intelligence. Comparison of behavior for the purpose of determining intelligence has been found to be valid only when the individuals compared have had practically equal experience in the test situation. Therefore, it can readily be seen that, in comparing the behavior of individuals of different races and different nationalities, it will

be difficult to find a means of determining whether or not the behavior differences are, strictly speaking, differences in the biological sense of the word, or whether they are due to environmental factors.

Garth [3] found that pure-blooded Indians, as a group, did less well on an intelligence test than did similar groups of mixed Indian and white blood or groups of pure white stock. But what can be concluded from such an experiment? There seems to be no doubt that in the kind of situation represented by these tests there were reliable differences between the groups, and that the differences favored the white race. But can it be said from this that one race is more intelligent than the other? The answer is no, unless intelligence is defined simply as ability to do well on these tests. There is a tendency for the whites and the Indians to live in somewhat different kinds of environments. In the mixed racial groups, those with a larger proportion of Indian blood tend to live like the pure-stock Indians, while those with a large proportion of white blood in their racial mixture tend to live like the white group. Such behavior differences undoubtedly exist, but it does not follow that they have a biological foundation. They may be caused by differences of experience. Possibly they are caused in part by each.

Studies have been made of the first and second generations of immigrants of different races and nationalities in the United States. These studies largely concern intelligence, because better measuring instruments exist for this trait than for any other. Significant differences have been found which favor sometimes one race or nationality and sometimes another. In trying to interpret the cause of the differences which are found, exactly the same difficulty is encountered as that mentioned in connection with Garth's study. There are also other troublesome factors. One has to do with the problem of sampling. Can any justifiable conclusions be drawn about the race from which immigrants came on the basis of the showing made by the immigrants themselves? Again the answer is no. The necessary data are not

[3] T. R. Garth, *Race Psychology,* New York, McGraw-Hill Book Co., Inc., 1931, pp. 75–76.

available to determine whether the group that emigrates is inferior, equal, or superior to those who are left behind. Nor is it certain that the factors that select those who emigrate are the same in each of the countries from which these people came.

Another group of racial studies has been made comparing the Negro and the white races. Here, too, there are some reliably determined differences, but there is the same difficulty of determining the cause of such differences. Even though the races are living in the same geographical area, they may, and often do, have vastly different life experiences. It is contrary to the first principle of science to attribute a result to a more speculative cause when a less speculative one is available. Certainly, many racial and nationality traits can be accounted for in terms of social conditioning.

For example, consider the stolidity which is attributed to the British people or the volatility of the Latin races. These need no biological explanation. The social characteristics of the national life are sufficient to account for the existence of these traits to the extent that they may be shown actually to exist. Of course, it is conceivable that significant biologically inherited differences do exist. Only several large-scale experiments can answer such a question. Such experiments would require raising children born of parents of one race in the homes of parents of another race and in the country and social setting of the race of the foster parents. This transfer of culture would have to begin very early in life. Even then, unless these foster children were raised exactly as other children in the foster homes, the results might not be conclusive.

Family Differences.—In nearly every community there are families who are outstanding in political, business, and professional life. The children from these families, more often than not, continue on the same general social level as their parents. It is also rather usual to find that there are some families in the same communities who are nearly always on the verge of poverty, if they are not actually dependent upon the community for their existence.

A number of studies have been made of eminent families like the Edwards family in America and the Darwin-Wedgwood family in England. Other studies have been made of the Kalikaks, the Hill Folk, and other degenerate stock. There can be little doubt that behavior traits do have a strong tendency to continue in families, generation after generation. The question of even greater interest here is whether this persistence of family traits in a matter of biological inheritance, or is due to so-called "social inheritance." Here again, as in the studies of racial differences, there are two factors that vary simultaneously, and the argument cannot be said definitely to favor either nature or nurture to the exclusion of the other. (See Chapter 3.)

Differences Due to Sex.—There are some very observable sex differences in the behavior of human beings. Some of these differences are directly dependent upon the greater average physical strength and size of the male. In other cases it is impossible to be sure that the differences are innate. When a certain boy was four years old, he received as a Christmas present a set of cotton-filled dolls representing the Three Bears and Goldilocks. Of all the things he possessed, those dolls were his favorites. One day he was delightedly showing them to an elderly gentleman caller who exclaimed, "What! A great big boy like you still playing with dolls!" This is only one illustration of the way in which social influences operate to insure the appearance of behavior that is approved for one sex or for the other. The play behavior of very young children does not show very great sex differences. Such differences as may appear can be accounted for largely in terms of the treatment by society of the behavior of boys and girls respectively. By the time of adolescence, however, both the *innately determined* and the *socially conditioned* differences have begun to show up distinctly. However, these two sets of factors, operating simultaneously as they do, cannot be satisfactorily separated at the present time.

Some of the behavior responses in which significant sex differences have been shown will be noted briefly. Schoolboys, on the average, do better than schoolgirls in mechanical work, in

mathematics, and in physical science. Girls, on the average, somewhat surpass boys in the language arts and in the courses which directly or indirectly bear upon social relationships. Women fatigue more easily in terms of absolute amounts of initial strength, but proportionately to their weight women's ability to withstand fatigue seems as great as men's. In naming colors, women are better than men, but this can undoubtedly be accounted for in terms of frequency and intensity of experience. There seems to be no reliable evidence of sex difference in ability to discriminate colors except for the greater frequency of color-blindness among men and boys. In intelligence test scores, there are no large differences in the locations of the central tendencies or in the amount of variation within the two groups.

It is true, of course, that more men than women reach levels of attainment and distinction that mark them as highly superior individuals. At the other extreme, it is known that there are more feeble-minded men and boys than women and girls in institutions for the feeble-minded. Both of these facts, however, seem to be adequately accounted for in terms of socially determined factors. On the one hand, society has compelled even very able women to spend their time and energies in the home. Whether this is as it should be is beside the point here. On the other hand, society has traditionally expected that the man shall leave the home and at least support himself economically. Also, he is usually expected to support a family. This results in the frequent failure of the feeble-minded man, while the feeble-minded woman often escapes this difficulty within the shelter of the home. Thus there seems to be no conclusive reason for believing that men are more variable than women in their capacity to behave intelligently.

In differences in the acuity of the senses, emotional stability, and in most personality traits, there is no evidence of the superiority of one sex over the other. The reader may be reminded that biological inheritance, which determines the sex, also determines the potentialities of the individual. Moreover, the factors of experience greatly influence the development of the inherited potentialities and the experiential factors differ between individuals and especially between men and women.

Differences Due to Maturity.—These differences are so apparent as to need no special attention where the levels of maturity compared are not close together; but when the levels are close together, some means is needed whereby the differences may be made apparent. Parents, teachers, and social workers frequently overlook significant differences of maturity, blinded by the factor of chronological age.

Gesell's method of direct comparison of two individuals in a controlled situation is a very useful and reasonably convenient method. The two individuals are put into the same situation simultaneously or independently. Then the differences in the behavior of the two children are noted and the conclusions drawn.

If the problem situation can be standardized, and the characteristics of the responses of many individuals of each chronological age noted, a means is secured of determining the level of maturity of an individual at any time within the range of the scale thus formed. This is the essence of a standardized test procedure. By one or the other of the two methods suggested, it is possible to determine characteristic differences in the behavior of individuals or groups. The potentiality of rapid, average, or slow development must be recognized as being largely dependent upon the individual's heredity. Hence the importance of a knowledge of heredity in attempting to understand the process of maturation.

Conclusion.—In the various kinds of individual differences which have been considered, it is not so much a question of deciding whether heredity or environment is the most important, or even of determining exactly how much influence each has in controlling the behavior of the individual. The essential thing to remember is that *both* groups of factors are important. The heredity of the individual cannot be changed, but the limits set by heredity must be recognized. The environment can be changed as a means of modifying the individual's behavior, but in so doing, an effort should be made to have such environmental factors fall in line with hereditary potentialities.

Amount and Significance of Individual Differences

Differences Are Quantitative, Not Qualitative.—It should be noted, first of all, that individual differences are in terms of amount and not of kind. In every kind of trait each individual stands somewhere between zero and the maximum. In comparing the total behavior of two persons, differences in personality are often erroneously believed to be due to the possession of different traits. All persons possess some degree of every trait.

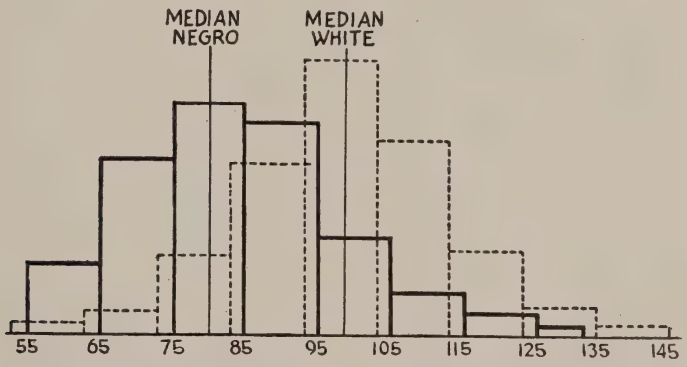


Figure 16. The Intelligence Quotients of White and Negro Children

It should be noted also that there is usually a direct or positive relationship between desirable traits. If an individual is possessed of a high degree of one desirable trait, such a trait is usually accompanied by a better than the average degree of other desirable traits. The notion of negative relationship embodied in the old saying that a "pretty girl could not have much sense" has been definitely disproved. Of course some relationships between socially desirable traits are closer than others, but all of them are positive.

How Large Are Differences Among Individuals and Groups?—Many persons find it surprising that when groups are compared by the "overlapping of groups" method, the differences are usually not large. Figure 16 shows the results when intelligence

test scores of one group of Negroes and whites are plotted on the same coordinates.[4] Here the median for the Negroes is about 82, while that for the whites is about 100. The data for the Negroes are from a table of Garth's. The solid line represents the distribution of the scores from the Negro group. About 20 per cent of this group equals or surpasses the median of the white group. The medians of the two groups are about 18 points apart. The difference between the highest and lowest scores for the

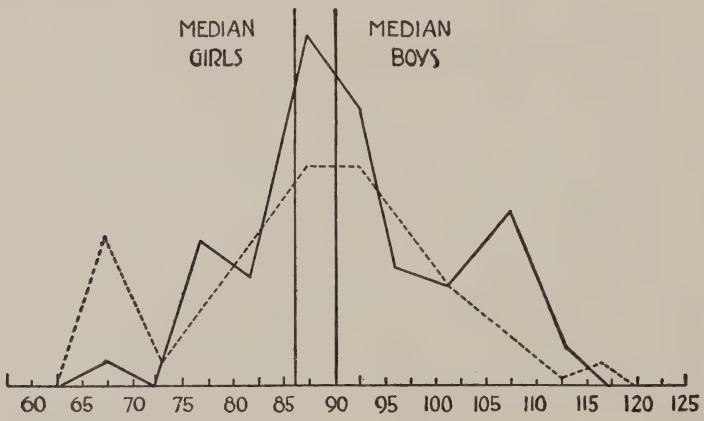


Figure 17. Scores by Boys and Girls on Stanford Arithmetic Reasoning Test (Seventh, Eighth, and Ninth Grades)

Negro group is about the same as that for the white group and is about 90 points. Thus it is apparent that these wide ranges of difference within either group make the small difference between the medians seem much less important than it is usually supposed to be. In this case, the difference between the best and the poorest in either group is about five times as great as that between the medians of the groups.

Much the same results are obtained if we compare the scores made by the two sexes in a trait that is supposed to be possessed to a much greater degree by males than by females. Figure 17 shows the difference between the sexes on the arithmetic reasoning sec-

[4] T. R. Garth, *Racial Psychology*, New York, McGraw-Hill Book Co., Inc., 1931.

tion of the New Stanford Achievement Test when administered to a group of junior high school pupils. The percentage of overlapping is very large, and the difference between the median scores of the two groups is very small compared with wide ranges of scores within either group. Similar relationships are found when family differences are compared. Such a large amount of overlapping should not be expected if the best type of family, like the Edwards family, is compared with the poorest type known, such as the Kalikak family.

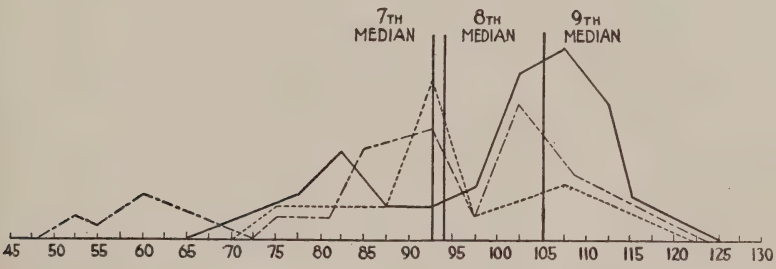


Figure 18. Scores by Seventh, Eighth, Ninth Grade Pupils on the Stanford Language Usage Test

Individual differences due to maturity may be demonstrated in the proficiency in language usage of junior high school pupils as is shown by one part of the New Stanford Achievement Test. Note the small differences between grade medians as shown in Figure 18 as compared with the range of scores within each of the three classes. Some pupils in the seventh grade are better than the median of the ninth grade, and some of the ninth graders fall below the seventh grade median.

These facts may be startling to those not already aware of them. Racial, sex, and family prejudices have been built up largely by unfair comparisons. It is often the practice to pick out the most intelligent members of one race and compare them with the least intelligent members of another. The same is done for other race, family, and sex comparisons. To be valid, a comparison must be made between the averages of large groups, and the difference between such averages should then be compared with

the range of scores in either group. This is only one of the simpler means of making comparisons.

It should be clear by this time that, on the whole, the differences between groups of individuals are, more often than not, rather small. But what of the differences among individuals within the group? How much better is the best of the group than the poorest of the same group? Fortunately, there are some data on this subject. Starch [5] has shown that in the eighth grade a comparison of the best and poorest scores made on tests covering the common branches of the school curriculum indicates that the best student is from 1.5 times to 26 times as good as the poorest student in the grade. Limp [6] provides further information. On the basis of 34 psychological tests covering a wide variety of behavior traits, the best is from 1.9 times to as much as 19 times as good as the poorest.

Hull [7] also has collected information from several sources relative to the ratio of best to poorest performance in a variety of vocational occupations. The best was from 1.4 times to 5.1 times as good as the poorest. In this group of data, Hull correctly calls attention to the fact that elimination of the obviously unfit from vocational occupation results in somewhat lower ratios. He concludes: "We shall probably not be greatly in *error if we conclude that among individuals ordinarily regarded as normal in the average vocation the most gifted will be between three and four times as capable as the poorest.*" [8] Differences of such magnitude are significant when one considers that the overhead in an industry is as great for a poor worker as for a good one. In fact, it may even be greater.

Differences Among Behavior Traits

How Do a Person's Traits Differ Among Themselves?—So far, consideration has been given solely to the quantitative differences of a given trait when that trait has been measured for groups of individuals. It is now time to consider the differences

[5] Daniel Starch, *Educational Psychology*, New York, The Macmillan Co., 1919.
[6] Limp, quoted from C. L. Hull, *Aptitude Testing*, Yonkers, World Book Co., 1928.
[7] *Ibid.*, pp. 34–35.
[8] *Ibid.*, p. 36. Italics in the original.

that exist when the individual is the constant factor and the differences are those between the several traits of the same person. The suggestion that desirable traits tend to accompany each other does not mean that all traits will be present in the same degree. Everyday observation of one's own and one's friends' behavior reveals some behavior traits which stand out above the average level of traits in that one personality. In fact, if it were possible to measure quantitatively all the traits of any personality, an approximation of the normal distribution would result. There would be a very few traits in which the person was either exceedingly high or exceedingly low, but most of his or her trait measures would cluster around the average of all of that person's traits taken together. Compared with the curves obtained when individual differences were discussed, these curves from the distribution of trait differences would have a narrower range, probably not over 80 per cent of the range of individual differences.[9]

There would also be differences among the averages of the traits of two different persons if an attempt were made to compare them. But again, the differences between the averages of the traits of these two individuals would be small as compared with the range of trait differences within either person.

This raises the question of certain specific abilities or talents, such as markedly superior ability in music or art, unusually retentive memory, mathematical ability, and mechanical ingenuity. The history of politics, literature, and science is full of instances of those who have shown a marked superiority in one field or in a group of somewhat closely related fields. Such superiority often makes the person's other capacities seem poor by comparison. Apparently, "the average individual's best vocational potentiality must be between two and a half and three times as good as his worst." [10] Hence the importance of capitalizing upon one's best traits both in ways of making a living and of getting along socially with one's fellows.

How Shall Aptitudes Be Discovered and Evaluated?—The problem of discovering one's own best aptitudes is an important

[9] *Ibid.*, p. 46.

[10] *Ibid.*, p. 49.

one, both for the sake of vocational and economic efficiency and for the sake of preventing undue wear and strain in living. How poor the world of science would be today if Darwin had not discovered himself and his own aptitudes after the schools he attended had called him dull! Similarly how different our mechanical and industrial world would be if Edison had not discovered his own aptitudes! Undoubtedly millions of square pegs have been trying to fill round holes, because they lacked the ability of these men to discover the work for which their aptitudes were best adapted.

Intelligence tests are recognized as one kind of aptitude test, but, unfortunately, there are few other tests of aptitude that are as well developed. Among the few ways that may be of some assistance in discovering one's greatest and one's poorest aptitudes, the following might well be included.

First of all, a complete and thorough examination by a competent physician is to be recommended. This should show up organic defects and structural peculiarities which might be disqualifying or might serve as a means of limiting the degree of reasonably expected success in certain vocational activities.

For many kinds of activities, it is now known approximately the amount of the aptitude called intelligence that is considered a minimum. Therefore, an intelligence test *administered and interpreted by a competent psychologist is of distinct value.* Such a test is merely useful in determining whether or not one has a minimum degree of this aptitude to make success in the chosen vocation reasonably possible.

In a few lines of activity specific aptitude tests are now available. There are tests for musical ability, mechanical ingenuity, and a variety of clerical tasks such as filing, taking dictation, and typing. Some of these are as yet hardly out of the experimental stage, while others are fairly well developed.

Another method that is useful, within certain limitations, is that of getting frankly critical evaluations of one's aptitudes from those who know one best and who, *at the same time,* know the requirements of the field of endeavor being considered. The two chief faults with this plan are in getting the friends to be

frank, and accepting their evaluation for what it is worth after it has been given. Men and women are often prone to consult those who are most likely to give satisfying and pleasing advice. A critical evaluation of those not so friendly may also be of value, since such advisers will not be merely flattering. Such advice must be carefully evaluated without rationalizing to escape its unpleasantness.

Then there is a frankly critical self-evaluation, difficult as that may be. Many persons are incapable of a very detailed examination of this sort and, of course, many are very prone to be prejudiced, timid, and uncertain.

Another means that has much to recommend it, although it has serious faults, is that of trying out the activity. The best time to follow this procedure is in youth while there is still time to try something else. This method is employed in some junior and senior high schools. Its chief disadvantage is the length of time required to try out adequately several different activities.

Finally, one may utilize his avocations as a means of discovering his aptitudes. A highway engineer is reported to have worked at his vocation for a number of years with only a fair measure of success and happiness. During this time he developed a hobby of amateur photography. In this side interest he developed considerable skill and reputation. Finally, he discontinued his engineering work and established himself successfully as a commercial photographer. He is happier now than he was in the highway work and is doing just as well financially. He had the opportunity, through his avocation, to try out an activity rather thoroughly before changing it to a vocation.

There are undoubtedly other ways of getting information about personal aptitudes. The important point here is that one must recognize that there is a considerable range between a trait or group of traits in which one has the highest capacity and those that mark the lower limit of one's own aptitudes. It is important to make as complete a self-diagnosis as possible before choosing a vocation. But this diagnostic self-analysis will be of little value unless the proposed vocation is also analyzed to discover the peculiar aptitudes that are demanded by that field of endeavor.

An Outline Summary

1. The characteristics of the differences among individuals when compared on the basis of any one trait.
   - A. All random groups show the same general qualities regardless of the trait measured.
     - (a) There is a wide range between the extreme scores.
     - (b) Most scores tend to fall near the center of the group.
     - (c) The farther away from the center of a group a score is found, the fewer similar scores there will be.
     - (d) All distributions of scores of random groups for any measured trait approximate a "normal" distribution obtained from "pure chance" events.

2. Kinds and amounts of individual differences when groups are compared on the basis of any one trait.
   - A. Anatomical trait differences generally tend to be greater than behavior trait differences.
   - B. Differences between the medians of two groups are usually small as compared with the differences within either group.
   - C. Heredity and environment are both important determining factors of individual differences and each must be considered in the light of the other.
   - D. Differences in behavior traits may be conveniently classified as
     - (a) Racial differences,
     - (b) Family differences,
     - (c) Sex differences, and
     - (d) Differences due to maturity.

3. Differences among behavior traits of the same person (i.e., trait differences).
   - A. Distributions of trait differences show the same general characteristics as do individual differences.
   - B. Vocational and personality adjustments require the discovery of the socially most and least desirable traits by means of:
     - (a) Standardized tests,
     - (b) Physical and psychological examinations,

(c) Objective self-analysis and the analysis of acquaintances, and
(d) Employment and avocational activities of several kinds involving aptitudes.

Problems for Further Thought

1. Carry out the experiment of penny tossing as explained in this chapter. If you are more ambitious use ten pennies and toss them 1,024 times. In either case, graph the results and compare with the normal curve, Figure 13. Compare your results with those obtained by others. In this experiment it will be easier if one acts as a recorder while another does the tossing and counting of the number of heads.

2. This is a class exercise. Let everyone measure the strength of grip of the right hand with a dynomometer. Tabulate the results for the sexes separately and compute the average for the two groups. How much difference is there between these averages? How does this difference compare with that between the best and the poorest scores in each group? Note. If a dynomometer is not available, substitute some other feat of strength that will be measurable, such as lifting a weight from the side straight out to a position at arm's length from the body, taking the number of times the weight is lifted as the measure of strength.

3. Booker T. Washington was unquestionably a most able representative of the Negro race. One sometimes hears his name used as a basis of comparison between the Negro and white races. Without even raising the question of which race, if either, is superior to the other, criticize the comparison involved in the argument.

4. Make an analysis of the personality characteristics that are of greatest importance in several occupations. Committees in the class may well devote their time to a single profession or occupation. Let each individual make an analysis of his or her own aptitudes by any means available. Care must be exercised in both these analyses that the processes be as objective and as unbiased as possible. If the committee reports of the analysis of occupations are posted, each person may well check his or her own self-analysis against each of these. It will probably be found that for most persons the self-analysis reveals more than minimum aptitudes for several vocations. Interests and other factors, such as ability to finance the necessary

professional training, will have to determine the course of action beyond this point. It should be noted that the chief purpose of this problem is to point the way for a beginning of a satisfactory vocational adjustment. Nothing more than that should be expected. It should aid in making the student more conscious of the importance of matching aptitudes with vocational requirements.

Suggested Readings

Individual Differences

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Aptitude Differences and Vocational Adjustment

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Hollingworth, H. L. Vocational Psychology and Character Analysis. New York, D. Appleton-Century Co., 1929. Ch. VI, "Self-Analysis," pp. 81–100; Ch. XI, "General Competence and Special Ability," pp. 165–176; Ch. XIII, "Interest as Vocational Determinants"; Chs. XVI to XVII, "Vocational Tests," pp. 272–293; Ch. XX, "Vocational Aptitude of Women," pp. 392–350.

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Chapter 13

BEHAVIOR THAT IS ABNORMAL

1. Day Dreams. Joe was an orphan of twelve who had been placed for adoption in several homes in succession. His latest foster father made a great point of truth-telling and on this point was dissatisfied with Joe. The following incident will illustrate one of Joe's difficulties:

One Saturday afternoon in winter, Joe was given permission to take the shotgun and go hunting for rabbits, of which there were many on the farm. His parents reminded him to be home before dark, but darkness was complete before he returned, thoroughly chilled and with no rabbits. He had enthusiastic tales to tell of the exciting hunting he had enjoyed that afternoon, not for the lowly rabbit, but for much more exalted game heretofore unknown in that broken, rocky, sage-covered district. When his attention was called to the fact that he still had intact all of the shells with which he started, he was not confused in the least, but enlarged his account of his adventures with tales of finding a more suitable weapon, which had apparently been used with telling effect. No questioning or obvious displeasure on the part of his foster parents resulted in anything but increasingly impossible accounts of his afternoon's adventure. What had probably happened was that he had approached the first straw stack looking for rabbits, and not finding any there, had seated himself on the sunny side of the stack, out of the wind. Here he had done the rest of his hunting in his imagination. When the sun had gone down and he had become thoroughly chilled, he was recalled from the world of his fantasy only by the cold realities of a winter night. He showed almost complete lack of ability to distinguish the events of reality from the more thrilling imaginary adventures of that afternoon.

2. A Type of Delusion—Persecution. A married woman of about forty complains that a man of her acquaintance has hypnotized her and is pursuing her, attempting to make her think and do "improper things." Further questioning reveals that this has all been done by "remote control," since the man does not even live in her community. In fact, she has seen him only a few times, and has never conversed with him or even met him. The man asserts that he does not know her by sight though he knows of her by name. The woman, however, blames him for her loss of several positions and for what she insists was her dismissal from a commercial business school. The director insists that the school never knew why she withdrew except that her work was obviously of poor quality. She blames the sinister influence of this man for her social difficulties in her community as well as for her marital difficulties and is incapable of recognizing the improbability of her explanations.

Characteristics of Abnormal Behavior.—There are several ways in which the word abnormal is sometimes used. The best use of the term is in its literal meaning—away from the normal. In a previous chapter, the terms "norm" and "normal" were employed to designate the average of many measures of a trait or the degree of a trait which occurred most frequently. Accordingly, an abnormal trait would be one that was different from the average or which did not frequently occur in the group. As a matter of fact, the more abnormal a type of behavior may be, according to this definition, the less frequently it may be expected to occur. Thus the illustrations cited above describe behavior so atypical, so abnormal, that one seldom encounters instances of them.

A word of caution is needed at this point. It is customary to think of abnormal behavior as socially undesirable behavior. A moment's thought will make clear the fact that wherever an average is recognized, there must be about as many instances which are above average as there are those below. This fact is sometimes overlooked, with the result that the term abnormal is often thought of only in the sense of worse than normal.

Society tends to frown upon any behavior that is very unusual. Nearly all persons feel uncomfortable about any of their behavior traits that they recognize to be conspicuously different from those of the other members of their social group. It has therefore become difficult to distinguish between the terms, "abnormal" and "socially undesirable." In this chapter the term "abnormal" will be used in its literal sense, as meaning away from the normal, but at the same time the common practice of regarding unusual behavior as socially undesirable will be kept in mind.

There are many degrees of abnormality. Actually, the average of any distribution of trait measures would be only a single point. Ordinarily all those measures of a trait that are fairly near the central tendency are called average in everyday usage. When the trait-measure goes beyond a certain degree of difference from the average, it is recognized as being abnormal. The practical difficulty lies in trying to fix the points between what may be called normal and abnormal. These points must be determined more or less arbitrarily, and social usage plays a large part in fixing them. Literally then, nearly everyone is abnormal in some degree in respect to every trait, since the measurements of very few, if any, are actually at the central tendency of the group. However, it is only when the individual's behavior departs largely from this mythical midpoint that such a person is said to behave abnormally. Note, too, that one may be distinctly abnormal in one or a few traits and yet behave in a satisfactorily normal manner in all other respects.

What Is Insanity?—"The insane are just like the rest of us, only more so." When a person behaves in a manner so unusual that he or she becomes a menace or a nuisance, society has agencies and institutions for their care. It is usually surprising to one who visits a modern mental hospital for the first time to find that it is sometimes difficult to distinguish between the patients and assistants in the hospital. The patients are often normal enough in all but a few respects. The instances cited at the beginning of the chapter are cases of this sort. Moreover, delu-

sions, day dreams, rationalizations, and such behavior traits are common to nearly all persons in mild degree.

The term insanity is purely a legal one, not a psychological one. It is used by lawyers, courts, and social agencies. The psychological and psychiatric method of designating extremely abnormal behavior is to call it a psychosis, a neurosis, or a psychoneurosis. Note the ending of all of these terms. *Osis* means illness. These abnormalities of behavior are regarded by the psychologist and the psychiatric physician as forms of illness. They are comparable in many respects to other kinds of illness, although they have some interesting characteristics of their own as does every kind of ailment.

Why Study Abnormal Behavior?—The foregoing discussion should help to explain why it is important to study abnormal human behavior. Because abnormal behavior is unusual, it tends to be conspicuous and interesting. Because it is an exaggeration of normal behavior, studying it is equivalent to examining normal behavior under a magnifying glass. The characteristics of the behavior pattern become more easily recognizable. Thus, by seeing these characteristics of himself manifested in an unusual and often in an exaggerated manner in other persons' lives, the normal person is better able to understand his own motives, habits, and inhibitions.

Convenient Classification of Abnormalities of Behavior.—Behavior abnormalities may take a very wide variety of forms. In fact, any kind of behavior which is manifested by human beings is probably distributed through the whole range represented by the normal curve. In approaching the study of abnormalities of behavior, this very great range may seem confusing. It is therefore advisable that some sort of a systematic approach be attempted by means of a convenient classification.

Sometimes a conspicuous breakdown in the organic structure is accompanied by a corresponding disturbance of normal behavior. The cause and effect relationship in such cases is fairly evident. However, in many severe abnormalities of behavior and

usually in the less pronounced cases, careful examination of the organism fails to show any such conspicuous breakdown or destruction of organic tissue. In order to account for the latter group of abnormalities, the cause must be sought in the previous experience of the individual. This raises again the point emphasized in a previous chapter that, at present, the nature of changes in structure resulting from experience are not known. These abnormalities of behavior not due to conspicuous organic causes are probably the result of subtle organic modifications resulting from learning.

It is customary to refer to the former class of abnormalities as "organic," while the latter group usually goes by the name "functional." This nomenclature may be a bit confusing since it implies that the functional abnormalities have no structural basis. Nevertheless, it is less confusing to use the terminology already well established than to attempt to develop another.

Abnormalities of Behavior Due to Unusual Conditions of Man's Organism

A Case of Amnesia Resulting from an Accident. A young college man collided with another player while practicing baseball and was knocked to the ground, violently striking his head. After a few minutes he resumed practice but seemed to his teammates to be a bit dazed. Within a few minutes he threw his glove on the field and, walking across a tennis court where a game was in progress, went to his room in the dormitory. This behavior was so unusual for him that one of the players was sent to see what was the matter. He found him in bed with his baseball clothes on. A short time later he was aroused, assisted in dressing, and taken to the college dining-room for dinner. There his behavior was noticeably unusual. He answered questions, but his answers were entirely irrelevant, and his conversation in general seemed much confused. Soon after dinner he was missed by his now anxious companions and a search was begun. He was found being brought back to the campus by an older acquaintance whose residence he had visited and where he had caused his host

much concern by his unusual behavior and conversation. This time he was put to bed, and watch was kept over him until he went to sleep. In the morning he seemed normal enough but had no recollection of anything that he had done since the preceding morning, several hours before the accident. The *amnesia,* for the period following the accident until the next morning, was complete and permanent. For the interval of a few hours before the accident, the amnesia was not quite complete and was partly recovered later. For several weeks after the accident the young man experienced considerable difficulty with fusion of vision for near objects, such as print. This gradually cleared up.

Characteristics of Abnormalities of Behavior Called "Organic."—The case described above is an illustration of the group of abnormalities called "organic." A characteristic of all organic disturbances is that they accompany and are presumably caused by destruction or impairment of some member or members of the body. Very often these are portions of the central nervous system. This destruction may be due to physical destruction of a part of the brain, as in the case of a war wound or industrial accident; or it may be caused by disease, as in paresis. Where paresis is present there may be considerable destruction of portions of the cerebral hemispheres. This is sometimes called "softening of the brain."

Other causes of behavior disturbances of an organic nature may be the accumulation of poisons and poisonous after-effects and such substances as alcohol, lead, opium, and the like, which may cause an actual degeneration of nervous tissue under some circumstances and hence bring about disturbances in the behavior of the individual.

Another group of organic behavior disturbances is due to brain tumors or to similar malignant growths within other parts of the nervous system. These malignant tissues may grow to a certain size and then cease their growth. In such cases behavior is definitely impaired and may remain so for the rest of the afflicted person's life. In other cases, the destruction may increase and cause death.

Somewhat closely allied to these disturbances are the paralyses due to hemorrhages within the central nervous system. Blood escapes from its proper channels into the surrounding nervous tissue, where it clots and impairs or prevents the functions of that portion of the nervous system. This blood clot may be reabsorbed and the nervous function may return to normal or, if the injury is very severe, it may result in either permanent disturbance of function or death.

The group of behavior disturbances discussed above are generally called psychoses, i.e., diseased minds. The term psychosis is reserved for abnormalities of behavior that are so severe that the personality is appreciably disintegrated and the resulting behavior differs strikingly from that exhibited prior to the onset of the disorder.

Still another group of organic abnormalities of behavior is due to defects of the several kinds of sense organs in the body. Many of these defects are of relatively slight degree. A striking instance of this is the case of color-blindness discussed in an earlier chapter. Tone deafness, a condition in which certain tones are inaudible, is another example. Any kind of sense organ may apparently be involved and in turn cause abnormalities of that part of one's behavior which directly or indirectly depends upon its functioning. Helen Keller's childhood illness resulted in the loss of sight and hearing. It can easily be seen how this interfered with the normal development of speech behavior even though the speech apparatus was left intact.

The endocrine glands are rapidly coming to be recognized as playing an enormous rôle in determining changes in bodily structural and corresponding behavior patterns. Some of these, like the thyroid gland, are fairly well known. The nature of behavior abnormalities resulting from the disturbances of others is not so well known. It will have to suffice here to cite one case from the literature now rapidly developing in the field.

Anna Stone was the mother of a six-weeks-old baby girl. She was driving with the child and her husband when they crashed head-on into another car coming around a sharp curve. Anna and the child were apparently uninjured, but the mother was shocked and panicky for

days after the accident. She became very nervous and irritable, going into rages over trifling disturbances in the household routine. She began to perspire and lose weight; in a few months, she declined from 140 to 90 pounds. Her eyes became prominent and seemed about to pop from her head. She developed attacks of palpitation and dizziness. For the most part, she was very depressed, although sometimes she would be elated. She could not sleep and complained of always feeling "as if I were on the go." She began to worry about her loss of weight and could not understand it in view of her ravenous appetite. She thought at times that "she was seeing things." But she felt she could get well "if only this thing in me which drives me on would let me go."

Anna's condition was so serious that it was necessary to operate upon her and remove most of the thyroid gland. After this, she began to gain weight and to become placid, and she left the hospital a "new woman," as she expressed it.

But within six months she returned. Her change was astounding; she had become enormous, having gained seventy pounds; her skin was dry and a pasty yellow, her eyes dull; she felt sleepy all the time and said, "I don't care whether school keeps on or not." She admitted she had not taken thyroid extract for more than two weeks after leaving the hospital; "it was too much trouble and, anyhow, I felt perfectly well."

It was obvious that she was a victim of a myxoedema, or a thyroid deficiency due to the removal of most of the gland and to a failure of the portion remaining to supply her with sufficient secretion for normal functions. With the gland feeding, she rapidly lost weight and has remained normal up to the present time.[1]

The thymus, the pituitary, and the parathyroids, the gonads or sex glands, and many other endocrine glands are undoubtedly intricately involved in large areas of human behavior. Changes in behavior invariably accompany changes in the function of any and all of these glands. The greater the change in the gland, the greater the change in the behavior.

Other kinds of "organic" abnormalities might be noted, such as those basic to the different degrees of intelligence or as they are manifest in such conditions as epilepsy, some of them only

[1] Louis Berg, *The Human Personality,* New York, Prentice-Hall, Inc., 1933, pp. 57–58.

poorly understood. The factors involved in differences in intelligence have already been discussed in a previous chapter, and those involved in some of the other abnormalities are too little understood to justify their inclusion in this discussion.

Abnormalities of Behavior Due to Unusual Ways of Adjustment

What Are Functional Abnormalities?—These disorders are called *functional* to distinguish them from the organically caused disorders already mentioned. A functional disorder is one for which no organic disturbance can be found as a cause. Organic and functional disorders may be thought of in terms of an analogy.

Suppose my watch fails to keep proper time and I take it to a repair shop where the watchmaker finds that a piece of the machinery is broken or bent. This corresponds to the situation found in the case of an organic disturbance of behavior. The behavior is irregular or different from the normal because some organic part of the mechanism is defective.

But suppose when I take the watch to the shop the repair man can find nothing wrong with the mechanism? It is all there. He may tell me this, but still I know the behavior of the watch is different from that of other watches. When he examines it further, he may find that the tension on the regulating spring is not correct. It may be that that particular watch is not so constructed as to be able to adjust itself automatically to differences in temperature. In either case, the situation corresponds to what may be called a functional disorder. In the first case the watchmaker may adjust the tension on the regulating mechanism so that henceforth it behaves according to normal expectations. In the second place, he may tell me to keep it always in a place where the environmental conditions (temperature in this case) will not require the watch mechanism to make an adjustment that is impossible, because of its construction. In other words, the adjustment must be made by adjusting the relationship of the behavior of the parts or by adjusting the behavior of the whole mechanism to

its environment. The adjustment cannot be made by replacement or repair of parts of the mechanism.

Any analogy has its limits of usefulness and breaks down when pressed too far. Therefore, it will be well to turn to an illustration from the field of human behavior for a case of a functional disorder.

As I entered the spacious but somber room where Miss M. and her crutch spent their days, I caught at first sniff that unmistakable scent which always accompanies a certain type of invalidism. The ingredients emanate from oranges which, like a stage property, seem never to be eaten; roses which have been kept too long; mentholated ointments which are forever being rubbed on—all dissolved in stale atmosphere. There appears to be a fixed incompatibility between this sort of invalidism and ozone.

It was my first meeting with Miss Emma M., although I knew her sisters. The elder was a successful wife and mother and a participant in civic activities. The younger was a violinist. This unfortunate middle sister I had heard spoken of as leading what is popularly called a "life of suffering."

She received me with a wan smile. Something about the smile was so familiar that I could hardly believe I had never seen her; later on I realized that I had merely caught the strong family likeness which appears in all the wan smiles of all the world's noble army of martyrs.

"It is such a pleasure to see someone from the outside world." (Her pensive voice certainly didn't suggest pleasure.) "A shut-in longs so for any mental breeze."

Wishing to be agreeable, I took the hint and, for a solid forty-five minutes, I toiled womanfully to breeze her up. I chatted about my trip to California, my climbing of the Grand Canyon, a prize play, an English author, the wet and dry issue; with might and main I pumped my mental bellows in a heroic effort to create that longed-for breeze. Utter failure.

For my every topic was turned, by a quick, deft twist, to point to her own affliction. Thus:

"California! Land of sunshine! And here in my north room the sun never peeps! The south rooms were needed by the others, you see."

Again, "You scaled the Canyon afoot! And I never leave this floor! It would have inconvenienced the family to have an elevator installed."

It was weeks later that I happened on an elderly physician I know well who has long been the M.'s family doctor. "I wish you'd throw a light on that situation," I said.

He hesitated. Then, "It's only fair to the rest of the family to do so. The truth is, they've used every means short of binding and gagging to drag Emma into the best south room in the house. Will Emma? Emma won't. She hangs on to her gloomy room with talons, so that she can feel abused. As for the automatic elevator which would permit her to get about, they'd gladly tear the house to pieces if necessary to install it. Let 'em? Not she. It would deprive her of another grievance. Grievances are her three meals a day and a snack between."

"How on earth," I marveled, "with sisters so wholesome, so genial, so altogether delightful, did she come to be as she is?"

"That's just it," he replied. "It's their being so that's the matter with her. Even her leg."

I was quite at sea by this time. How Miss M.'s leg could be paralyzed by the fact that her sisters were charming, I confess I did not see.

"It's like this," he went on. "From childhood the others were uncommonly popular, and Emma was left out. Not their fault; they were always lugging her forward, but they couldn't make people like her. She had a whining voice and she was dull and disagreeable. Now, see how it worked out. She saw her sisters shining while she was left in the background. Instinctively she fought to gain attention, to be important. Not knowing how to achieve her end by legitimate means, she resorted to others. She magnified every slight ailment, she complained of every grievance. The family kept on their toes to please her, and indulged her as being *delicate*. Still, no medical examination could find anything the matter. At last she had a fall. Slight fracture—healed quickly. But she has never since been able to walk."

"You mean she *thinks* she can't walk?" I puzzled.

He shook his head. "No. I mean she *can't*. Understand, in the judgment of all consulting surgeons that leg is absolutely well. But she has a genuine ailment. The point is that it's not in her leg; it's in *her*. In her effort to convince others, she has convinced herself until she has created a reality. My dear," concluded the veteran doctor, "there's no disease so sad as that of the wretched human being who, endowed with life's two greatest blessings, sound brain and sound body, is so physically diseased that he can't can."[2]

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[2] Sarah Comstock, "On the Eating of Worms," *Harper's Magazine*, January, 1931, pp. 229–230.

In this case the disorder of Emma's leg was functional. Physicians could find nothing whatever organically wrong with the member or with the nervous system pertaining to it. Nevertheless, the paralysis was there and continued to be there in spite of medical treatment. In fact, medical treatment in the ordinary sense was quite inappropriate in such a case. To be able to do anything in treating such a case it is necessary largely to disregard the symptom, in this case paralysis, and seek for underlying causes. These causes will often be found entirely outside of the patient's organism itself. They lie in the individual's habits of reacting to his environment. The paralysis served to provide Emma with a lot of satisfying attention which she had not succeeded in getting in competition with her sisters. In order for any treatment to be successful, it will have to proceed from this point.

Functional Disorders Are Different from Malingering.—It must be emphasized that these functional disorders are genuine. They are to be differentiated sharply from malingering, in which the sufferer definitely pretends to be ill and recognizes that his behavior is not in keeping with the real facts.

During the war there were a good many cases of "shell shock." In these cases the soldier characteristically "went all to pieces." His total behavior pattern was shattered. As a soldier he was at least temporarily but genuinely unfitted for further combatant military service, although nothing seriously wrong could be found with the man's organic mechanism. On the other hand, there were innumerable cases in which the soldier attempted to be placed on "sick call" in order to escape some dangerous or unpleasant duty. He might even deliberately maim himself by a self-inflicted wound so that there would be no question about insuring at least temporary absence from the dangers of the front line.

In times of depression like those of recent years a similar type of functional neurosis sometimes develops. An interesting newspaper account of such cases is here taken from the Associated Press dispatches:

Depression shell shock is the newest ailment confronting medical men. It is brought on in victims of hard times in much the same way as the familiar shell shock attacked soldiers in the World War.

A victim of this "disease" unconsciously magnifies some minor ailment into a disabling sickness in order to escape the worst difficulties of poverty and unemployment without losing his own self-respect and the respect of others. It is described by Dr. Roscoe Hall, clinical director of St. Elizabeth's Hospital, federal institution for mental ills.

A man suffering from "depression shell shock" undergoes exactly the same mental processes as a war shell shock victim, Dr. Hall explains. In many instances, however, his case is more difficult to handle because the fears built up by battling enormous economic odds often are greater than those inspired by the horrors of battle.

A wartime shell shock victim was torn between two desires—one for self-preservation and the other for self-respect by his fellow soldiers. To run away would be disgraceful, yet to face the dangers of battle seemed unbearable.

The depression victim is faced with much the same dilemma, says Dr. Hall. Under the American scheme of things, it has been considered disgraceful to be unable to earn one's own living. A man out of a job has two alternatives: to keep up the fight for a job, going hungry and, worse still, seeing his family suffer; or to apply for public relief.

To many, however, asking for charity seems as cowardly as running away from battle. The solution, for both the soldier and the unemployed man, is the unconscious one of developing an illness.

The soldier knows it is not disgraceful to leave the front lines if he is too ill to fight. The depression victim can avoid the futile struggle for existence if he is too ill to walk the streets. Usually the victims do not realize that they have followed this course of reasoning, and their illnesses are real, but caused almost entirely by a mental process rather than by some physical disorder.

The depression shell shock victims, like those of the war, probably in many cases will continue to need treatment and care long after the emergency that caused their trouble is over, Dr. Hall believes. At the start of the present depression, relief agencies still were rehabilitating victims of the previous depression of 1920.[3]

Functional Disorders Are the Result of Two Sets of Incompatible Habits.—In the discussion of the functional disability of

[3] Associated Press, *Greeley Daily Tribune,* July 12, 1934.

the "shell shocked" soldier above, it might be said that there is a conflict between the subconscious and the conscious ideas, but it will be possible to come closer to grips with the treatment of the case if such a verbal entanglement is avoided. Let it be recognized, then, that the patient has two or more patterns of habits and reflexes which are mutually incompatible. The soldier, for example, cannot carry out the two sets of habits simultaneously. One must be shelved to make room for the other, or a general disorganization of behavior may and often does result. This soldier is in somewhat the same fix as the dog which is stimulated to produce a scratch reflex on both right and left shoulders at the same time. The dog cannot scratch his right shoulder with the right hind foot and at the same time employ that same hind foot to sustain the body's weight while he scratches with the left hind foot.

The case of Anrep's dog is also a close parallel. Anrep first trained the dog to approach and feed from one box. At the same time he trained the same dog to stay away from the punishment always attached to another box. The boxes were identical except that one was surmounted by a circle and the other by an ellipse with the short axis equal to the diameter of the circle on the other box. After thus establishing two different habits to two different stimuli, he gradually shortened the long axis of the ellipse to a point where the dog could not distinguish between it and the circle. Here he reports that the dog's general behavior broke down. He manifested many of the symptoms of a "nervous breakdown" of a human being. He became cross, ugly, and very irritable, although before the experiment he had had what might be called a friendly, happy disposition that made him something of a pet in the laboratory. It was even necessary to send him to the country for a few weeks for a "rest cure." This is a clear case of two incompatible sets of habits elicited by what *to the dog was the same stimulating situation* with the two boxes. The parallel to human behavior is close enough to be at least suggestive.

Characteristics of Functional Abnormalities.—Ordinarily this type of abnormality presents a number of characteristics by

which it can be recognized. First there is the point, already stressed, that no organic disfunction can be found which will satisfactorily and directly account for the abnormal behavior. It is universally true, however, that the patients believe that the cause is organic. They usually resent even the implication that the distresses they are suffering exist only in their thinking and not in their legs or arms or hearts or other parts of their organisms.

Another common characteristic of functional disturbances of behavior is the suddenness with which these symptoms appear and disappear. The onset of the disabilities is often sudden, and in cases where they do disappear the recoveries are usually almost miraculous. These are the kinds of disabilities that are cured in the excitement of public demonstrations of "faith healing."

It is also characteristic of such abnormalities of behavior that they serve a purpose useful to the patient, although this purpose is often difficult to determine. Not that the patient recognizes the purpose or even believes it when it is pointed out, but nevertheless the purpose is universally present. These abnormalities represent attempts on the part of the patient to escape from some difficult problem. The solution is usually an inadequate one, but is the most satisfying one available to the patient. The case of Miss Emma M. (see page 274) is an excellent illustration. Her functional paralysis was the solution to her problem of getting the attention that she had never otherwise been able to get. At the same time it enabled her to avoid unfavorable comparisons with her sisters. Solutions of this kind have a way of being very inadequate to the patients and they are usually an annoyance to those who must live with these sufferers.

Some Common Types of Functional Abnormalities.—Only a few of the most striking types of functional abnormalities will be cited. When a person's behavior is disturbed so that it differs from the normal behavior of the social group to the extent that the whole personality is distorted, the resulting state is called a psychosis as with organic abnormalities. Psychopathic hospitals have many cases of functional psychosis. Pronounced delusions

often appear as important parts in the disturbed behavior of psychotic patients. The Emperor Napoleons and Queen Marys that are found in almost any state hospital for the insane are usually suffering from functional psychoses. The neuroses and psychoneuroses are lesser departures from normal behavior. In these categories are found the neurasthenias, hypochondrias, shell shocks, and depression psychoneuroses.

Neurasthenia is the name given to that type of an abnormality in which the person feels perpetually tired when there is no sufficient physiological cause. College students' spring fever is probably a mild kind of neurasthenia. The student is motivated to do the work that is waiting to be done and at the same time to loaf and enjoy the spring weather. All would be well if one could do both or do one without being distressed by not doing the other. A frequent solution is to rationalize one's tiredness so that the studying may be conscientiously set aside.

Hypochondria is a type of abnormal behavior in which the person is overly anxious about every little ache, pain, and organic sensation. Such a person can read the label on a patent-medicine bottle and immediately identify in his own person all the symptoms described. They are the world's army of martyr sufferers—"never understood" by the succession of physicians and healers who are called in. One eminent medical diagnostician has remarked that if, in his diagnosis, he discovered that the patient had undergone more than two major surgical operations, he immediately called in a psychiatrist because such a case almost always needed the treatment of such a specialist.

Functional amnesias (loss of memory for certain parts of past experience) are frequently reported in the newspaper. They usually represent persons who would "like to get away from it all" and who have found this the only method of escape that appears to be available. Closely parallel to this are the functional paralyses and functional anesthesias (loss of sensation) such as the reduction of acuity of vision, hearing, and sense of pain and touch. In all such cases there is usually little disturbance of the personality as a whole. Sometimes a general distintegration is avoided by dissociations into a split personality. In these cases

the patient organizes the two or more incompatible patterns of behavior into separate compartments and by completely dissociating them from each other avoids the difficulty, after a fashion. The fictional case of Dr. Jekyll and Mr. Hyde represents the type of disorder in which a complete dissociation has taken place, although the author's explanation of how it was brought about is highly fanciful.

Other Means of Escaping from Unpleasant Reality.—Not so far from the normal are found some commonly occurring behavior traits that can scarcely be considered abnormal at all. They frequently appear in the lives of nearly everyone. Who, for example, has not at some time engaged in "wishful thinking" to the point that the thing wished for has been believed true? The "tall" stories of one's own exploits and experiences are familiar cases of this sort. It has previously been pointed out that the so-called insane are just like everyone else, only more so. This should now be quite clear. As the above discussions and illustrations have been followed, many readers will have noted the similarities between this or that description and instances of their own behavior.

Rationalization and projection are essentially the same in that both are activities involving some degree of failure to recognize the real reasons for doing what is done. Rationalization is the process of sorting out the reasons, accepting only those which coincide with one's desires, and failing to recognize contrary ones.

A college woman is trying to decide whether or not to visit her home during a four-day holiday. She recalls that her mother has been ill. It is six weeks since she has been home. She needs some clothes and books that are at home. A good rest will be very beneficial, and so on at great length. She fails to recognize that the trip will be expensive and an inconvenience at home, that she could have the things sent by parcel post, and that she will get very little rest. She sifts the arguments for and against and accepts only those in favor of doing what she wants to do. In this respect her arguments differ from genuine reasoning.

Projection is very similar. Here, too, a *good* reason is sought in preference to the *real* reason. It differs from rationalization in that, in projection, the individual places the blame for something already done onto an immaterial cause and overlooks the real causative factor. A girl is carrying a bucket of milk from the barn to the house. She stumbles and spills the milk and blames the rock in the road. The material factor here is that she was not watching the path. The child late for school says the clock at home must be slow. Maybe it is, but he overlooks the fact that he stopped to play on the way to school.

The author witnessed an interesting case of this sort a year or so ago. A neighbor driving his car past the author's house had to stop because he ran out of gas. He examined the tank, found it dry, and protested to high heaven that someone had stolen his gasoline. Probably he had forgotten to fill the tank, as he keeps his car securely locked in his garage in the basement of his own house. In fact, the very loudness of his protestations was indicative of the fact that he was trying to convince himself as well as his neighbors that his predicament was due to no carelessness on his part. If he can believe that the gasoline was stolen, he is relieved of the blame or chagrin that goes with a recognition of his own carelessness.

Day dreams of both the suffering-hero and conquering-hero types are common experiences. The case of Joe, cited earlier in this chapter, is an illustration of the latter type in an aggravated stage. Then there is the type of behavior that is sometimes called the "sour grape" attitude and another that is the opposite which is sometimes called "sweet lemon" behavior. A schoolgirl is not invited to a party. She tells her companions that she did not want to go to "that old cat's party anyway." Another girl gets a new pair of shoes for Christmas and announces that it is just what she wanted all the time, although a few days before she has been heard to wish for a new dress. Dreams during sleep also provide a means of escape from what would otherwise be unpleasant ways out of a difficulty. Yawning and sleep may even be forms of defending one's self from tiresome and annoying situations. Finally it is a matter of record that young persons in school, from

the elementary to the college level, show more frequent illness at the time of examinations than at any other times of the year. The illness in such cases is often the pupil's attempt to solve a difficult situation when motivated by two incompatible sets of habits. One of these makes him fear the results of making a poor showing, while the other makes him eager to conform to the social expectations of his group. Of course, if he were ill, no one would really expect him to take the examination. Thus, he can avoid running counter to the social expectations and at the same time can at least temporarily be relieved of the possibility of making a poor showing on the examination. To be sure, he must convince himself that he is sick in order to maintain his own sense of personal integrity. Hence the functional illness. This is essentially the course of events in functional abnormalities, whether the behavior shows relatively large or small departure from the norms of the group of which one is a part.

The important element in all these types of escape behavior is that they are more pleasant than the real facts of the life situation. They provide a substitute for reality and a way out of annoying difficulties although it must be recognized that the means of escape is usually rather unsubstantial. In any case, it is necessary that the individual convince himself of the reality, if there is to be any satisfaction at all in such a way out of a difficult problem.

It should be noted again that such kinds of behavior are not abnormal. They are not in themselves even dangerous. The abnormality exists in allowing such activities to become habitual to a point where they become so satisfying that a *real solution of the difficulty becomes impossible.* In other words, the danger lies in developing a set of habits of dealing with life situations which are incompatible with the biological demands of life and the demands of living successfully with others in a complex social order.

The problem of preventing undesirable abnormalities of behavior and of remedying them when they do occur is an important one and will constitute a large part of the discussion in the chapter that follows.

An Outline Summary

1. The nature of abnormal behavior.
   - A. Abnormal behavior resembles normal behavior in being a response of an organism to a stimulus.
   - B. Abnormal behavior differs from normal behavior only in being unusual or less frequent than that ordinarily found in similar situations. Behavior is not regarded as abnormal until it departs from normal by a considerable degree.
   - C. The dividing line between normal and abnormal behavior is always an arbitrary point fixed by social usage.
2. For convenience, abnormal behavior is classified according to its cause.
   - A. Organically, where it can be directly accounted for in terms of a known breakdown of organic structure, and
   - B. Functionally, where the abnormality cannot be accounted for directly in terms of a structural fault. Such abnormalities often show evidence of the incompatibility of two or more established responses aroused simultaneously by the same stimulating situation.
3. The degrees of abnormality.
   - A. Abnormalities so severe as to disturb the integration of the whole personality are called psychoses.
   - B. Neuroses and psychoneuroses are type names for abnormalities severe enough to disturb the normal behavior of the patient in one or more important respects without excessively disrupting the general personality.
   - C. Minor functional abnormalities such as day dreams, rationalizations, projections, and "sour grapes" delusions are more frequently found and are not especially dangerous except as they become exaggerated or greatly multiplied in frequency.

Problems for Further Thought

1. Do you know any persons who have become partially deaf and whose general behavior has come to be different from the average by reason of such abnormality? What are the usual differences in such cases? Note especially any evidences of such behavior traits

as delusions and unusual compensations. Write up a case of this sort, noting the ways in which this person has adjusted to the affliction (whether the adjustment be wholesome or not).

Consider also the case of any person you may know in which there are evidences of a supernormal sense of hearing (any of the other senses will serve equally well). Write up an account of the manifestations of this kind of abnormality.

2. It is not always true that very unusual deviations from average height (or weight) cause deviations from average behavior, but these cases do appear frequently. Undoubtedly, you know of such instances from your circle of acquaintances. Make a list of unusual characteristics of behavior which you have noticed—of unusually tall women and unusually short men. Why are these deviations of structure more significant than unusual tallness of men and unusual shortness of women? In the same way, why is unusual heaviness or fatness more significant, especially for women, than unusual thinness as a factor governing behavior in social situations? Can you imagine social conditions where the reverse might be true? Describe them.

3. From your own experience, recall an occasion of rationalizing which is now clearly such, rather than good reasoning. Show what was the real reason in this case. Do the same for a case of your own projection of a blame onto someone or something else, or recount some significant day dream and point out the motive really involved.

4. Faith healing is as old as man's history. Would such healing be more likely to succeed in the case of functionally caused or organically caused abnormalities? What evidence can you find that they are not always cases of functional abnormality? Remembering that individuals with a functional abnormality always believe it to have an organic basis, what credibility can be placed in the testimony of the functionally ill on the point of whether their illness is functionally or organically caused?

5. The "sweet lemon" or Pollyanna type of behavior, in which a person "kids himself" into believing that no matter what happens it is always for the best, is frequently advocated as an ideal way of meeting life's disappointments. What are the difficulties in securing such behavior? Of even more importance, what are the shortcomings or even dangers of such a mode of behavior?

6. Probably all readers will know of one or more cases of "nervous breakdown." Examine carefully a case of this type and pick out the two conflicting drives (usually involved in separate habits) that cause the conflict. Show how these habits become incompatible, i.e., how they come to be called out in the same stimulating situation.

7. "Spring fever" is a mild form of neurasthenia that bothers many people. Show how the conflicting drives in such a case develop. Why do most people who get this "fever" get over it after a few days or weeks, usually without knowing what has happened? Suggest means that a person may employ to arrive at an effective solution of the conflict involved.

Suggested Readings

Berg, Louis. The Human Personality. New York, Prentice-Hall, Inc., 1933. Ch. IV, "The Glandular Basis of Personality," pp. 48–81; Ch. VI, "Maladjustment," pp. 93–117; Ch. XI, "Personalities in Conflict," pp. 189–221; Ch. XIII, "The Psychoses: Personalities in Flight," pp. 236–282.

Conklin, E. S. Principles of Abnormal Psychology. New York, Henry Holt & Co., 1927. Ch. II, "Sensory Abnormalities," pp. 22–42; Ch. IV, "Distorted Thinking" (Paranoia), pp. 60–77; Ch. V, "The Psychoses," pp. 78–112; Chs. VI and VII, "The Psychoneuroses: Psychasthenia, Neurasthenia, Compulsion, Neurosis, Anxiety Neurosis, Hysteria," pp. 113–159; Ch. VIII, "Shell Shock," pp. 160–177; Ch. XVII, "The Abnormally Endowed," pp. 388–421.

Fisher, V. E. An Introduction to Abnormal Psychology. New York, The Macmillan Co., 1929. Ch. I, "Some Typical Problems in Abnormal Psychology," pp. 1–9; Ch. IV, "The Conscious, Subconscious, Conscious and Unconscious," pp. 57–73; Chs. V to VII, "Some Common Modes of Reaction to Difficulties," pp. 74–153; Chs. VIII to XI, "The Psychoneuroses," pp. 154–370; Chs. XII to XIV, "The Psychoses," pp. 271–354.

Hart, Barnard. The Psychology of Insanity. 4th ed., New York, The Macmillan Co., 1931. This is another small book that has had a long and interesting life as a book. It is essentially Freudian in point of view and sympathy.

Hollingworth, H. L. Abnormal Psychology, Its Concepts and Theories. New York, The Ronald Press Co., 1930. Ch. I, "Meaning and Use of Abnormal Psychology," pp. 3–21; Ch. IV, "Contemporary Viewpoints—The Neuro-Anatomical," pp. 69–91; Chs. X and XI, "Psychological Origins of Functional Disorders," pp. 214–256. Several other chapters in this book will be found to be of interest to the reader without previous background in this field.

Morgan, J. J. B. The Psychology of Abnormal People. New York, Longmans, Green & Co., 1938. Ch. I, "Introduction," pp. 1–32; Ch. II, "Disorders of Sensation," pp. 33–68; Ch. VIII, "Motor Disorders," pp. 268–309; Ch. IX, "Abnormalities of Intelligence," pp. 310–348; Ch. XIII, "Hysteria," pp. 472–505; Ch. XIV, "Disorders of Regression," pp. 506–533; Ch. XV,

"Compensatory Disorders," pp. 534–564; Ch. XVI, "Episodic Disorders," pp. 565–592.

Moss, F. A., and Hunt, Thelma. Foundations of Abnormal Psychology. New York, Prentice-Hall, Inc., 1932. This whole book is written with emphasis upon the organic phases of abnormal behavior. It thus forms a good companion reference to such texts as Morgan, Hollingworth, and Conklin. Note particularly Part II, Chs. XI to XXI, inclusive, "A Consideration of Specific Diseases."

Chapter 14

DEVELOPMENT OF MENTAL HYGIENE AND ITS APPLICATION TO EVERYDAY LIFE

What Is Mental Hygiene?—Everyone is well aware of what is meant by bodily disorders or diseases. But there is another phase of health which may be called mental health. Mental health may be defined as that state of mental well-being in which the individual is adequately adjusted to the facts of his social environment and is capable of making further adjustment to such new situations as may arise. Mental health is characterized by a flexibility of power to adjust, a contact with reality, and a satisfactory integration of the whole personality.

In man's attempt to combat and prevent organic diseases, there has been developed a branch of medical science which is called physical hygiene. Its aim is to prevent and combat the infections and ravages of the diseases of the organic mechanisms of the body. In recent years a similar science called mental hygiene has developed parallel to this. Its aim is to prevent and combat the disorders of behavior commonly called mental.

Historical Résumé of the Treatment of the Insane.—In ancient times the insane were almost universally believed to be possessed of evil spirits or devils. In one of Christ's miracles, it is told that he cured an insane man by commanding the "legion" of devils to depart from him. Whether or not one believes in the miraculous deliverance of the afflicted man, this serves as a typical example of the prevailing concept of insanity in the time of Christ. There are several other instances in Biblical literature of persons who are "possessed" of evil spirits. This belief is characteristic of primitive peoples and still persists to a certain extent.

Medical science grew slowly through the Middle Ages, only gradually gathering momentum as knowledge of the body in-

creased. The medical treatment of physical disorders, even as late as the beginning of the nineteenth century, seems now to have been woefully haphazard. George Washington died probably as much from the blood letting that his physician thought necessary for him as from the effects of the severe cold he had contracted. It is not surprising, therefore, that treatment for mental ill health was almost wholly unknown, even as late as a hundred years ago.

Until 1773 there was no such thing in this country as a hospital exclusively for the mentally ill. Prior to that time and for some time afterward the insane were confined in "madhouses," which at their best were little better than jails and for the most part were infinitely worse. The violent patients were heavily manacled, while the harmlessly insane were allowed to roam at will and get along as best they could. These were the "Tom o' Bedlams" of England and the witches and warlocks mentioned in the literature of the Scottish countries. The care of those who were confined in "madhouses" consisted only of providing an inadequate supply of food and shelter. No one cared how they fared. They were outcasts of society and were in a sense the living dead. They were confined only for the safety and convenience of society until death released them from the terrible burden of life.

About the year 1800 Pinel in France became convinced that this procedure was entirely wrong. He advocated kindliness, elimination of almost all restraint, and an attempt to restore the patient to normal social life through individual understanding and treatment. He was regarded as a bit "mad" himself even to advocate such things. However, Pinel's teachings gradually began to have effect. Even as late as the beginning of the nineteenth century it was customary to allow visitors to see the inmates of one of these "madhouses" in Philadelphia upon payment of a small fee. The idle and the curious might go there much as people today go to see the curious creatures in a zoological garden.

At the beginning of the present century nearly all the state institutions for the insane were indoctrinated with the idea of

restraint and treatment by force. Medical treatment was very meager; exercise, at least for the more violent ones, was almost completely lacking; sanitation was often very bad, and no one had even heard of occupational therapy. Such patients as could be occupied for the profit of the institution might have something active to do if they were not violent, but if they were violent they were placed in a solitary, padded cell or possibly even in a "strait jacket." In a few private institutions conditions were somewhat better. Psychiatry had just begun to get its terms defined, and much of the time and energy devoted to the study of psychiatry was still being spent in classifying symptoms and tabulating data.

Contrast these conditions with those of a modern psychopathic hospital. It is usually housed in a building whose appearance is no different from any other large modern hospital. There are locks, it is true, but the bars, the padded cells, and the strait jackets are conspicuous by their absence. The hospital staff is made up of a corps of competent psychiatrists, psychologists, psychiatrically trained nurses, and other specialists. Each patient, when admitted, is given a complete medical, psychological, and psychiatric examination. All are housed in rooms or dormitories which are models of cleanliness and sanitation, to say nothing of comfort and cheerfulness. Trained social workers gather needed information about the patient's home, business, and community life. Occupational therapy is employed as an important part of the treatment in many cases. This consists of suitable employment, not for the gain of the institution, but for the recovery of the patient. In a very genuine sense it is a hospital, a place where those who are ill may go to regain their health.

Origin and Growth of Mental Hygiene Movement.—In 1903 and 1904 Clifford W. Beers was confined first in a private and then in a state institution for the insane. He recovered, more because the disturbance had run its course than as the result of the treatment he received in those institutions. Then, while the experience was fresh in his memory, he wrote a remarkable book, *A Mind That Found Itself*. In this book he traces his own experi-

ences from boyhood as they were later related to his psychosis. He tells with remarkable clearness the incidents of the beginning, duration, and recovery from his mental illness. Out of his experience in these institutions was born the determination to do two things. His first aim was to correct the conditions that commonly existed and that he had experienced in institutions for the insane. Second, he hoped to do something that would prevent others from having to suffer experiences like his own.

Interest in Beers' effort grew, and in 1908 the Connecticut Society for Mental Hygiene was formed. A year later the National Society for Mental Hygiene was organized. Now such societies exist in many states, all of them branches of the national organization. In 1930 an International Congress for Mental Hygiene was held in America. Thus the movement has outgrown all local or national boundaries.

The history of the National Society's activities is divided into three parts. The first lasted until the entry of the United States into the World War. During this pre-war period its major efforts were directed toward reforms and improvement of the teatment of the mentally ill. Effort in this direction still continues. During the war its efforts were directed chiefly toward reducing the amount and intensity of mental ill health in the armed service. Since the war its major aims have been the education of the public in matters of preventive mental hygiene, and the establishment of clinics outside of psychopathic hospitals, but serviced by experts, for the purpose of discovering and remedying behavior problems before they become so severe as to need hospitalization.

Relationship of Mental Health to Physical Health.—There is a relationship between mental health and the organic functioning of the body which should be quite apparent after the discussion in the previous chapter. Sometimes even fitting a person with glasses when they are needed will contribute materially to the reduction of general nervousness and instability. The clearing up of focal infections in the cases of bad teeth or tonsils will sometimes have the effect of clearing up behavior problems. Treat-

ment for glandular imbalance or malnutrition can also do much to remedy certain mental conditions.

It must not be inferred from the above that a person cannot be in reasonably good mental health if he is afflicted with such bodily infirmities. "A sound mind in a sound body" is a very creditable objective for every human being, but lack of the sound body does not make a sound mind impossible. Often it is the habits of the individual that get him into his worst behavior difficulties.

Every competent practicing physician recognizes that in many cases a large part of his success depends not only on his treatment of the physical disorder but on his advising the patient as to the best way of adjusting to his malady. This is particularly true in cases where the physical handicap is of a permanent nature.

Relationship of Success and Failure to Mental Health.—If the author were making a child's bill of rights, the first item on the list would be a demand that every child be provided with an opportunity for a reasonable degree of success and approval by society within the range of that particular child's capacities. This, of course, is equally important for adults. Almost invariably children are brought up in such a way as to make social approval in some form a thing greatly to be sought. To be able to do something that will be approved by others constitutes for most persons one of the most important elements of what is called success. The demands that are made by society are sometimes entirely out of proportion to the capacity of some of its members to meet these demands. The less intelligent child in school and the less competent business man or laborer in commercial and industrial life often fail to succeed because society has expected what is literally impossible. This is true in normal times, and during periods of unusual stress it becomes acutely so.

There may be tragedies in life, as great as, but there is none greater than, that of the child in school or the man or woman in business, in professional or social life, who is below average in capacity to succeed in these fields, and who at the same time is expected to uphold the traditions of a brilliant family.

Allan Williams, 22 years of age, was employed by a firm of wholesale jewelers as a messenger. His salary was not sufficient to enable him to support himself had he not lived at home. His work was simple, but it involved responsibility for the carrying of jewelry, often of considerable value. He seemed to be competent, and his employers were satisfied with his work. However, Allan was not happy, largely because his work and his low salary made it impossible for him to get away from home and live his own life.

His father was a professional man of considerable ability. His mother and an aunt who lived in the home also came from a professional family. The adults of the family were united in their desire that Allan should attend the state university and enter some profession. Therein lay the difficulty. Allan had a mental age equivalent to about that of the average twelve- or thirteen-year-old boy. How he had finally, after six years of patient plodding, accumulated enough credits to be graduated from high school will always be something of a mystery. At any rate, Allan had no wish for more schooling. His ambition was to go to live on a farm and learn the poultry business. This probably represented more of a desire to be away from the parental disapproval than any fondness for chickens. The parents could not be made to see that Allan was anything more than a "bit timid." The young man will be doomed to the unhappiness of attempting what is impossible for him until circumstances free him or until he finds the home situation intolerable and takes matters into his own hands.

Mental Health and Learning to Face Reality.—Everyone finds it hard at times to distinguish the real from the imagined in the various ways that imagination manifests itself. We sometimes say, "Pinch me to see if I am awake," or "Can this possibly be real?" The child is more easily to be excused for mistaking reality and fantasy than is the normal adult, because of the difference in the adult's maturity and the greater amount of previous experience he has had. When an adult continues to make such mistakes, he or she is said to be childish. Nevertheless, adults do

continue to mistake fantasy for reality to a remarkable degree. Such activities as rationalization, projection, and day dreaming are not essentially dangerous or even mentally unhealthy, so long as one has frequent opportunities for success in terms of real situations. These escape activities are employed because they do restore an equilibrium of tension, however imperfect that restoration may be. The danger to mental health lies in the fact that the habit of seeking success in terms of fantasy "steals upon us ere we are aware." Having firmly established the habit, one is motivated more easily in that direction than in the direction of reality.

The following case will serve as an example. A woman who was dissatisfied with a rather prosaic married life attended all the motion pictures exhibited in a small city. She enjoyed particularly stories of love and romance. Eventually she became dissatisfied with her husband and her home, although both were probably as good as the average. She complained that she "couldn't see why they [her family] couldn't have things nice and do interesting things like other people do." She had got her ideas in these matters largely from the screen, and she had acquired the habit of confusing the events on the screen with real events of her life to the point where it interfered with her adjustment to her real problems of living.

Mental Health and Preventive Hygiene—Critical Points in the Life of the Individual.—As in other fields of hygiene, the modern emphasis in mental hygiene is being placed upon prevention. It is deemed wiser that the individual be rightly habituated in the first place, than that he or she be allowed to establish faulty habits and thus make it necessary to be reeducated. In the following paragraphs it will be possible to point out and to discuss very briefly only a few of the points in the life of a person in which the importance of preventive mental hygiene is emphasized.

Immediately after birth the child begins to form habits that are of importance throughout life. Among the most important of these are the habits of adjusting to others. *Consistency* and *regularity* are to be emphasized in all dealings with the infant and young child. If at one time the child is given satisfying attention

for showing off and at another time is punished for the same activity, how is he to become rightly habituated? Many of the inconsistencies of the child are merely reflections of those of the parents.

The establishment of adequate foundations for proper emotional and social habits is of the utmost importance. It seems to be significant that nursery and pre-school classes for very young children are becoming more numerous in recent years. These schools have arisen to meet the demands of life in the modern home, where the child has fewer companions and fewer home occupations than in years past. Possibly parents are beginning to recognize the importance of proper social habituation in these early years and the loss, through modern conditions of life, of much that formerly served this important purpose.

Another point that is stressed by mental hygienists concerns the experience of beginning school. The school supplies a new source of authority, new routines to be adopted, and new allegiances to be formed. This is a problem for the parents as well as the child, and some parents tend to resent the division of authority and the establishment of allegiances outside the home. These adjustments for the child, unless properly prepared for through like experiences before entering school, may precipitate a crisis which may later have far-reaching effects upon the child's adult personality.

The period of adolescence presents a number of critical situations. The one which merits the greatest stress from the viewpoint of mental hygiene is that which Dr. Leta S. Hollingworth [1] has so aptly termed "psychological weaning." What was said in regard to the child entering school is also applicable to the adolescent entering or preparing to enter adult life. The parents so often find it difficult to "let go." They continue to advise, prohibit, enjoin, and instruct as in earlier childhood.

A mature unmarried woman reports that if she invites a gentleman friend to the house for the first time, he is welcomed by the parents. If he is invited again the welcome is less cordial, and

[1] L. S. Hollingworth, *The Psychology of the Adolescent,* New York, D. Appleton-Century Co., 1928.

by the third time that particular friend's welcome is worn out. This has happened repeatedly. To make matters worse she has been so trained as to be miserable if she meets gentlemen friends by appointment elsewhere than at home. The parents have probably not admitted to themselves that they want her to keep on living with them instead of marrying.

Parents are frequently heard to say of the young adolescent, "Don't you just hate to see them grow up?" thereby expressing a wish to keep their children as they are. The adequately adjusted adult must sooner or later establish an independence from the home. Where this independence cannot be achieved gradually and normally, it must be established later, at the death of the parents if not before. It then becomes a very painful ordeal, involving great stress and a difficult process of rehabituation. The basis of the ever-popular "mother-in-law" jokes is exactly this inability of many mothers to "let go" of their children when they marry. They still feel that their advice and care is needed. Naturally this leads to friction in the newly established home.

Other critical points or problems of adolescence have to do with adjustments in matters of sex, religion, economic independence, establishing moral or ethical codes, philosophy of life, and the like. Mental hygiene recognizes these as critical points of habituation and through its educational programs and its behavior clinics attempts to prevent mental ill health from accompanying such habituation. Certainly adolescence must not be overlooked in any program of mental hygiene.

For adults, maladjustments seem to center around the home and the social-business life, with the greater frequency in the former group. Mental hygienists in their preventive program pay more attention to the periods of childhood and adolescence. The adult period marks the time where the attention is most frequently directed at attempts to cure or correct the results of earlier faulty habits. This probably should not be the case. Prevention is as important in adult life as in earlier years.

Mental Health and Remedial Mental Hygiene—Significance of Symptoms.—It has already been intimated that the symptoms

observable in abnormal behavior may be misleading. In the case of a boy who frequently plays truant from school, the truancy is often taken as a point for the application of remedial treatment. The boy is whipped, kept after school, or otherwise punished for the truancy. This may lead to a cessation of truancy from school, but if the underlying causes are not treated simultaneously it may reappear or the behavior of the boy may take some other equally abnormal or even more undesirable turn.

Medical practice has about given up the idea of treating symptoms. Now it is customary to regard a fever only as an indication that there is an organic disturbance within the body. Actually the fever is only a manifestation of the body's efforts to bring about a normal condition. This is exactly parallel to the psychiatrist's attempt to remedy the abnormalities of the patient's behavior. He notes the symptoms carefully as a means of diagnosing the patient's difficulty, but does not apply treatment to the symptom itself. Parents and teachers are often not so wise in their methods of handling such cases.

Characteristics that are apparent in any abnormality of behavior are often best regarded merely as symptoms that something is wrong. In the case of a neurasthenic person, is is important to recognize the perpetual weariness and irritability as an indication that the person is maladjusted. Rest cures have been tried with some apparent immediate success, only to result in a relapse when the patient returns to the old family, school, or business environment.

A number of years ago a young woman was graduated from a liberal arts college and began to teach school. She wished to go into the business world, but this was regarded by her family and friends as beneath the dignity of her social station in life. Within the first school year she had a "nervous breakdown" and was treated in a hospital. She apparently had recovered and at the urging of her family took another teaching position. Again she came to the verge of a nervous breakdown within a few months. She then took matters into her own hands, resigned her position, and secured another in a dry-goods department of a large mercantile establishment. Here the physical energy demanded was

great, but within a year she was promoted to an important position in that establishment, where she was very happy.

Here is a clear instance of a symptom, i.e., the "nervous breakdown," which was simply an indication of a maladjustment. The underlying cause of the maladjustment lay as much in the woman's environment as in herself. She was an intellectually superior person with well-developed habits of being annoyed at the immature intellectual responses of her pupils. At the same time she had well-developed habits of doing what her parents and her social group regarded as "proper." Hence the inevitable conflict of habitual responses. Her solution was not necessarily the only suitable one, but it did remedy fundamental causes of the disturbance and not merely the symptoms.

From the standpoint of remedial mental hygiene, then, it is evident that it is important to use the symptom of the inappropriate behavior as a means of discovering the underlying factors which cause it. From this diagnosis it is possible to proceed rationally to a solution of the difficulty. Very often these remedial measures involve a change in the environment more than immediate attention to the individual himself.

Remedial Mental Hygiene as a Problem of Reeducation.— If the readjustment is to be genuine and of a lasting character, it must include some reeducation which most commonly and most importantly involves the patient himself. It may also involve changing the habits of others who form a part of the patient's environment. Situations which necessitate rehabituation occur when one is entering school, leaving home, or being married. When a child is born into the home, not only must the child be habituated to many social routines, but the parents must also be rehabituated in certain important respects. When an adolescent leaves home for school or for a home of his own, the parents must in some measure be rehabituated to the new situation.

It is desirable from the point of view of good mental health that rehabituation shall be as gradual and as progressive as possible. Parents should recognize the necessity for eventual separation of the adolescent from the home and begin a gradual

process of emancipation years before the final separation is made. In such a case the actual separation will be a mentally healthy one for all concerned. On the other hand, separation due to such a cause as death is often followed by a period of mental ill health during the process of reorganization of habits. In some cases where the unfortunate person cannot manage alone, assistance must be sought from competent psychiatrists.

Religion and Mental Hygiene.—Religion has been considered an important agency in bringing peace of mind and happiness to those who embrace its teachings. This may be true in general, but it is certainly equally true that religious beliefs and unbeliefs have been the source of much of the world's turmoil and of individual maladjustment and unhappiness.

Much of the religious teaching of the world has been reduced to little more than a series of doctrines and dogmas. The really dangerous thing about these dogmas is that they are given all the authority and weight of approval of a Supreme Being and their acceptable interpretations are kept in the hands of a few selected persons. These religious doctrines and teachings are to be believed, but they are not to be subjected to the rational judgment of the believer.

In the days of limited knowledge and of few opportunities to know personally very many items of information, much had to be accepted as the truth simply because it appeared to be the truth. As time went on men learned to check the truth of statements in the secular world. It was only natural that similar attempts should be made in the field of organized religion. This attempt, however, has been consistently repulsed by many religious leaders and teachers. The attitude of organized religion has consistently been that layman and priest alike should believe the established doctrines as revelations from a Supreme Being.

In religious as in other types of situations, many persons are found who develop two mutually incompatible sets of habits. According to one they are required to behave as rational beings, subjecting all sorts of statements to the critical analysis of reason-

ableness and common experience. They are required by an increasingly strong tendency of social stimulation to be thoughtful and deliberate in their rational judgments. On the other hand, their habits of religious belief demand another and different type of mental activity. Here *acceptance* of the doctrine is the chief requirement. The individual is even encouraged "not to question, but rather to believe." This, of course, brings about varying degrees of functional disintegration of personality. Probably the most common form of this breakdown of behavior is that represented by the person who dares not allow himself to doubt and so shuts off his religious beliefs from the rest of his mental experience. This is sometimes called a "logic-tight" mind and is the only way that some people can gain any semblance of satisfactory mental adjustment. At best such an adjustment can be only partly satisfactory, and at its worst it leads to serious disintegration of personality.

Another valid criticism of much of the world's present and past religious teaching is that such teaching encourages the devout to flee from the realities of everyday life problems. He sees constantly held out to him the reward of a future life where all is just and no worry exists. He is encouraged to accept these promised intangible and unworldly rewards in lieu of the satisfactions that normally result from solving the problems of life in a present and very real world. This tends to encourage the believer to rationalize his actions and project his failures and shortcomings upon other "wicked persons" or even upon the Devil himself. In many organized religious efforts too little emphasis is placed upon the present realities of life.

The mentally unhealthy aspects of religious behavior have so far been given the greatest emphasis, but this tells only part of the story. More and more the modern tendency in the development of religious thought leans toward a mentally helpful and healthful program. The humanitarian and social service aspects of religion have been receiving much more attention in recent years. Greater emphasis is being placed upon life in the present and upon behaving in accordance with social codes that have much to be said in their favor. Religious leaders are recognizing the

fact that, as the social order changes, the specific social codes must change with them. Organized religion is encouraging its followers to face the realities of this world and are placing less emphasis upon the ideas of future reward and punishment. This makes religion more truly a hygienic device for assisting its adherents in meeting life's difficulties and in making a satisfactory life adjustment.

Mental Hygiene and Sex.—Sex is a perfectly normal form of human motivation, just as much so as hunger and thirst. Sex behavior, however, differs from hunger and thirst behavior in that it has a greater social significance. This fact alone creates the need for even greater emphasis upon a rational consideration of sex problems than upon other less powerful motives. Sex habits involve much more than the behavior immediately concerned with reproduction. The other phases of sex education have been greatly neglected. All young people need training in habits, ideals, and attitudes concerned with the routine living together of the two sexes in the social group. Such habits, ideals, and attitudes are usually years in the building. When they are expected to develop suddenly, mental disturbance will invariably follow. Again, in the case of such a suddenly expected development, one is the victim of two sets of incompatible habits, and the usual result is some degree of personality disturbance.

Something needs to be done both individually and socially to desensitize people in the matter of irrational emotionality concerning sex. Relatively little can be done about changing the attitudes of the older members of this generation. Attitudes have the characteristics of habits. Those which are of concern here are habits of thinking which for many adults have long been established and which are often strongly reinforced emotionally.

The typical sex education program, where one does exist in the home or school, centers too exclusively upon matters of the biology and hygiene of reproduction. This is unquestionably important, but it is not so important as to justify the exclusion of training to meet the demands made upon young men and women in their adjustment to members of the opposite sex in the give and

take of ordinary social life. Children and adolescents need training in all the imaginable ways in which individuals of one sex adjust themselves socially, in the large sense, to members of the other sex.

An Illustrative Case.—By way of illustrating the significant effects of mental ill health upon the behavior of one person, let us consider the case of a college girl chosen because this girl's maladjustment involves so many of the factors already mentioned in this chapter.

Mary had apparently led a very secluded life until she came to college. Her religious teaching had been abundant and strictly orthodox, in accordance with the teachings of her parents' faith. These teachings involved ideas of the sinfulness of dancing, card playing, theater attendance, and the like. Consequently her experience in social adjustment had been very limited.

Her instruction in the matter of sex had been woefully inadequate. Even her knowledge of the simple biology of sex was very limited. Her ideals and attitudes of sex in a larger sense were badly in need of readjustment. In some respects there were indications of fixation upon the father as an ideal. There seems to have been an almost complete lack of normal social contacts with members of the opposite sex during high school. She had been taught that all men were to be regarded with caution, if not with actual suspicion.

There was evidence of only one case of an adolescent love affair, and that was with an older man and was confined to admiration from a distance. There were apparently some very close friendships with one or two girls which bordered upon what are sometimes called crushes, although she did not recognize them as thwarted sex responses. She had never been away from home. Mother or father always directly or indirectly made all her decisions of even minor importance.

Thus prepared, Mary went to college. She had to rebel almost openly to get there without her mother going along to keep house and care for her. However, she stood firm, but afterward had qualms of conscience about her behavior to her mother. In col-

lege she made new friends, mostly among the girls. During her first year her "dates" with college men consisted exclusively in walking home from church with one or another of them.

She was very soon in doubt about her religion, not so much from any teaching in her college classes as from a recognition that other college men and women did not believe as she did. She was compelled to decide whether her parents were right in their teachings about men and about her religious beliefs, or to doubt whether the friends she came to know were, after all, decent and respectable young men and women. She was too intellectually honest to doubt the latter, but it was a painful jolt to believe the former.

Added to her other difficulties was an organic defect of only moderate importance, discovered by the college physician. She was worrying much about her other troubles and simply added this physical defect to the list. All in all, Mary was a most miserable and unhappy young woman. She admitted afterward that she had seriously contemplated suicide as the easiest solution. Probably only her own uncertainty and lack of initiative prevented this unhappy solution of her difficulty.

Several years have passed since she found herself in these complicated situations. She has succeeded very well, with help, in establishing herself emotionally by emancipating herself from her home with a minimum of discomfort to herself and her parents. She fell into and out of love several times and developed habits, ideals, and attitudes about sex that should have been part of her normal development before the time when she entered college. She has married and is a happy and successful wife and mother. She is now part of a group who regard her as a very fine, well-balanced young woman. The organic difficulty is unchanged, but is no longer a cause for worry.

All in all, Mary has gained a degree of mental health that would hardly be credible to those who knew her only in college. But how much distress, how sad the delay of good mental health, how much discomfort to herself and others resulted from the deplorable mental hygiene conditions in which she spent her childhood and most of her adolescence.

Characteristics of a Mentally Healthy Person.—Good mental health is necessary to a socially efficient and dependable life and to the attainment of a satisfactory degree of genuine and lasting personal happiness. If this statement is a fair evaluation of the importance of mental health, it would seem desirable to attempt to discover the characteristics of the mentally healthy person.

It has been brought out in this and the preceding chapters that mental health is largely dependent upon certain habits of behaving. The mentally healthy individual is therefore characterized by *habitually:*

1. Attending primarily to the present situations, being free from worry about the past and future except as they are vitally related to the present.
2. Facing facts as they really exist without distorting them through imagination. (Failure or refusal to recognize facts as they exist and imaginary distortion of facts to make them either more or less favorable than they are is conducive to mental ill health.)
3. Keeping physically fit through a desirable regime of work, rest, and recreation, giving special attention to the removal or correction of remediable defects.
4. Compensating in a *constructive* way for those unpleasant facts in life which are unalterable.
5. Seeking to discover all possible facts about his own personal capacities and inadequacies without undue feelings of superiority or inferiority.
6. Adjusting his environment and ways of life to his personal capacities and inadequacies.
7. Having a variety of interests, one or a few of which constitute the basis for vocational adjustment, the remaining ones forming the bases of avocations.
8. Finding a desirable and adequate means of self-expression as an outlet for emotionally toned drives. (Includes outlets for creative activity.)

9. Achieving some successful and satisfying social relationships.
10. Developing a good balance between self-reliance and a normal sense of social dependence.
11. Learning to recognize evidences of unhealthy reactions in himself and to deal with them effectively.

Such a list of habitual modes of living is of importance only as it furnishes the reader with a means of checking upon himself and upon those to whom he must adjust socially. A discovery of the area within which readjustments must be made is the necessary first step in the direction of a more mentally healthy way of getting along with oneself and with one's associates.

An Outline Summary

1. The development of treatment of the insane.
   - A. In ancient times the insane were regarded as being possessed of evil spirits and were social outcasts, confined in institutions and given care only when they were dangerous to society.
   - B. At present the insane are regarded as persons who are mentally ill and are treated in hospitals for the purpose of restoring them to their place in society.
2. The organized mental hygiene movement:
   - A. Began through the influence of Clifford W. Beers and his book, *A Mind That Found Itself,*
   - B. Has grown to international proportions with active programs in many countries, and
   - C. Has its present efforts directed primarily toward prevention rather than to remedial measures.
3. The task of the mental hygiene program involves:
   - A. Keeping behavior in line with the characteristics of the mentally healthy person, and
   - B. Assisting in the restoration of mental health when it has been impaired.
4. Mental health difficulties require:
   - A. Analysis of:
     - (a) The difficulty itself as represented by symptoms,

(b) The needs and possibilities of rehabituation of the person involved, and
(c) The environment of the one concerned, with special reference to the possibility of modification to relieve strain.

B. Treatment, which may take the form of:
(a) Reeducation (rehabituation) or
(b) Readjustment of the environment to relieve strain and to make possible a limited adjustment within the limited possibilities of the patient.

5. Special problems of the program of mental hygiene.
A. Certain social problems are frequently involved in mental ill health and deserve special consideration. Among these are:
(a) Religious beliefs and religious education, and
(b) Sex education in its most comprehensive sense.
B. Certain points in the chronological development of the human being deserve special attention as potential danger spots. Among these are:
(a) Early infancy with its problems of wholesome beginnings of social adjustments and routines,
(b) Beginning school—establishing new social contacts, and
(c) Adolescence with its problems such as that of "psychological weaning."

Problems for Further Thought

1. We usually enjoy a short story or a novel because of one of two rather different reasons. It may be a means of escape from the realities of life or it may be a means of interpreting and understanding certain phases of life which to a great extent have fallen outside the realm of our experiences. Probably any piece of literature may, in some measure, serve both functions at the same time, but ordinarily one or the other is clearly recognizable as a chief reason for reading the story. Thus when I read the *Adventures of Sherlock Holmes,* it is probably chiefly as a means of relaxation and escape from the toils of the day. On the other hand, when I continue through a book like *Kristin Lavransdatter, Ultima Thule,* or *The Seven Pillars of Wisdom,* it is because they contribute to me some-

thing of a better understanding of certain phases of life not so fully experienced in person.

Make a list of all the books you have read within the last year and classify it on the basis suggested here. What does the result suggest? Is there any significance in a preponderant number of "escape literature" items on your list? Explain. Of what significance would the absence of any such motives in reading be (if any)?

2. Suggest several specific ways in which religion may be involved in severe cases of mental ill health. Make your suggestions on the basis of experience or very carefully considered observation of acquaintances. Why are cases so often found in psychopathic hospitals in which the patient has convictions of having committed the unpardonable sin? How is this feeling of grave guilt related to mental health?

Make a list of as many mentally hygienic activities as you can that are encouraged and fostered by religious institutions. What are the most important ways by which such institutions can encourage healthy-mindedness?

3. How dependent are you upon forms of recreation which are essentially commercialized and "looker-on" activities? Make a list of all the recreations in which you have engaged for the last month. Define recreation here as activities in which you have participated just because you wanted to. Now classify them (five classifications) on the basis of: First, are they solitary or do they essentially involve others? Second, do they demand equipment to the extent that the recreational facilities are owned by a commercial interest and rented to you? Third, were they activities in which you were essentially a participant or a looker-on? Fourth, if they were group activities did they involve members of your own sex only or are they essentially bi-sexual activities? Fifth, did they require skill obtained by previous practice? Note that under each classification there are two possibilities for each activity.

Before going further mark in some significant way the activities on the list that you most enjoyed. Now compute the approximate percentages under each of the five classifications suggested above. Note how many of the preferred activities fall within each group.

Further continuation of this exercise would suggest a compilation of the results of the whole class so that each member would have a basis of comparison of himself with the average of the group.

4. The most frequently encountered problem of adolescents is that of establishing, at the proper time, a sense of independence. It manifests itself in a variety of ways. Make a compilation of the unsigned answers of all the members of the class to the following questions. (Indicate sex, since there are sex differences in some of the following.)

(1) How many children are there in your family younger than yourself?

(2) Have you ever had an allowance, definite as to time and amount?

(a) How old were you when it was first supplied? (b) Was it yours to do with as you saw fit or did someone tell you how it should be used? (c) Were you made to save it or was that a problem for you to decide?

(3) When did you first have a latch key so you could come in at night without making someone wait up for you?

(4) When did you first have a "date" with one of the other sex with the knowledge and approval of your parents?

(5) When did you first have a voice in the matter of the choice of your clothes? Do you now have the full responsibility of choosing what you will wear?

(6) When were you first trusted with the family car when no other member of the family was along?

(7) When were you first given responsibilities in the home such as caring for the house and yard and similar chores without supervision from your parents?

When the results have been compiled compare your answers with the average of the class. Then write a short paragraph on "Things I Wish My Parents Wouldn't Do." How many of these unliked things pertain to the difficulty of making parents realize your maturity? Before leaving this list, answer for yourself the question, "Am I really capable of guiding and directing myself in these matters without having to pay too great a price for learning by experience?"

5. Sex education is another problem that offers difficulty during the period of adolescence. In a manner similar to that suggested in Problem 4 above, answer the following questions pertaining to obtaining information about sex.

(1) How old were you when you first knew the basically essential facts of bi-sexual reproduction?
(2) Who supplied you with your first information about sex? (Parents, other relatives, doctor, or playmates?)
(3) What courses in elementary school and high school added to your sex education?
(4) What other courses in college have made a contribution in this respect?
(5) Were questions pertaining to sex ones that you could ask your parents without embarrassment to them or to you?
(6) What factors have contributed (within the scope of your knowledge) to your embarrassment in matters pertaining to sex? To your lack of embarrassment in such matters?
(7) To what extent have your various experiences in home, school, and church tended to make you regard things pertaining to sex as shameful, sinful, or disgusting? Answer by checking the one most appropriate term in the following list: (a) very much, (b) to a considerable extent, (c) moderately, (d) very little, (e) not at all.

6. Read one of the following books dealing with first hand experiences of the writers as inmates of hospitals for the mentally very ill. Write your reaction to the account indicating what *new points of view* it has given you about such patients and such institutions.

A Mind That Found Itself, by C. W. Beers.
Reluctantly Told, by Jane Hillyer.
Asylum, by William Seabrook.

A recent novel that presents a good picture of the life of the patients and a staff of such an institution is Phyllis Bottome's *Private Worlds* and Brand's *The Outward Room.*

Remember that Beers' book describes conditions that do not now generally prevail. *Asylum, Private Worlds,* and *The Outward Room* give a much better picture of modern conditions.

Suggested Readings

Berg, Louis. The Human Personality. New York, Prentice-Hall, Inc., 1933. Ch. XIV, "The Quest for Happiness," pp. 283–308.

Burnham, W. H. The Normal Mind. New York, D. Appleton-Century Co., 1924. One of the earlier books on mental hygiene by one of the pioneers in the field.

Elkind, Henry (Editor). The Healthy Mind. New York, Greenburg, Publisher, 1929. This is a series of papers by seven outstanding leaders in the field of mental hygiene, each of whom has contributed a chapter.

Groves, E. R., and Blanchard, Phyllis. Introduction to Mental Hygiene. New York, Henry Holt & Co., 1930. This book covers many different aspects of mental hygiene problems in its several chapters, each dealing with a separate problem. It is more comprehensive than most, including some phases of the mental hygiene program that are of greater social than individual significance.

Howard, F. W., and Patry, F. I. Mental Health. New York, Harper & Bros., 1935. This book is essentially a text and is one of the most recent in the field. It covers the whole field with emphasis upon the application of principles of remedial and corrective purposes.

Kirkpatrick, Edwin A. Mental Hygiene for Effective Living. New York, D. Appleton-Century Co., 1934. This is another recent textbook. Here the emphasis is upon personal adjustment.

Morgan, John J. B. Keeping a Sound Mind. New York, The Macmillan Co., 1934. This book is particularly directed to the individual's problems of mental health. The title suggests the essential characteristic of the book.

Oliver, J. R. Psychiatry and Mental Health. New York, Chas. Scribner's Sons, 1932. This particular book on psychiatry is cited in preference to any other because it is probably the most readable and understandable for the layman of the many that are available. Dr. Oliver is not only a physician and psychiatrist but is also an ordained priest in the Protestant Episcopal Church. This gives the book an unusual point of view but adds rather than detracts from its readableness and interest-holding power. It originated as a series of lectures designed to meet the need of individuals only meagerly trained in psychology.

Strecker, E. A., and Appel, K. E. Discovering Ourselves. New York, The Macmillan Co., 1931. Especially Part II, "The Psychology of Everyday Life—The Conflicting Urges of Thought, Feeling and Action."

Woodworth, R. S. Adjustment and Mastery, Problems in Psychology. Baltimore, Williams & Wilkins Co., 1933. This is a small volume that will prove helpful to many readers.

Autobiographies and Fictional Accounts

By Former Asylum Inmates

Beers, C. W. A Mind That Found Itself. New York, Longmans, Green & Co., 1908.

Bottome, Phyllis. Private Worlds. New York, Houghton Mifflin Co., 1934.

Brand, Millen. The Outward Room. New York, Simon & Schuster, Inc., 1937.

Hillyer, Jane. Reluctantly Told. New York, The Macmillan Co., 1926.

Seabrook, William. Asylum. New York, Harcourt, Brace & Co., 1935.

Chapter 15

THE INTEGRATION OF PERSONALITY

Purpose of This Chapter.—In Chapters 1 to 14, a number of the individual characteristics of man's behavior have been examined separately and each has been treated as if it were an independent factor. This procedure was necessary for a better understanding of each specific phase of human behavior. In the present chapter we shall assemble again that which has been taken apart for separate examination, with a view to obtaining some understanding of that vaguely defined thing that is commonly called personality. An attempt will be made to present a picture of the whole personality—that which makes each person someone apart from all others. This will not be an easy task, for the reason that it is usually easier to examine the parts of a thing separately than to study the complex integrated whole. But the only really worthwhile result of the study of man's behavior comes from an understanding of his behavior as a whole person.

Difficulties in the Study of Human Personality.—The axiom of geometry which states that the whole is equal to the sum of its parts is oftentimes assumed to be equally true in all other fields. However, even a casual examination of a personality will indicate that when that person's behavior is examined bit by bit the results of the analysis do not yield an adequate picture of that thing which identifies him as a person. In so far as personality is concerned, the whole can be said to be equal to the sum of its parts only if the relationship between the parts is also considered as an integral factor.

Another difficulty that is encountered in the study of personality is the great complexity of the factors which contribute to the development of the thing as a whole. It has been repeatedly noted in the previous chapters that the behavior of the individual

is determined by everything that influences his or her organic mechanisms. To this must be added the effect of the total stimulating environment which is present at the time of the response and immediately preceding it. What a personality is will be determined by the amount and kind of influence contributed by each factor, as that factor is related to and acted upon by each of the others. The mutual relationships of these several factors are so complex and so varied for different individuals that it is difficult to draw many significant general conclusions. About all that can be said is to repeat that biological inheritance seems to set the limits of development and the potentialities of behavior. Whether or not these limits are reached will depend in large measure upon the experiences resulting from the individual's "social inheritance." But in accounting for an individual's personality it is not enough to examine hereditary and social factors independently of each other. Each must be considered as it is related to and is acted upon by the others. This necessity presents itself repeatedly in the study of personality and is a requirement that must be reckoned with.

Maturity must also be considered in both its biological and its social aspects. By their early twenties most persons are at their maximum capacity, considered biologically. Social maturity is a different matter. Maximum flexibility and modifiability are probably related to early life, yet it is true that as long as life lasts some flexibility and modifiability of behavior persists. Maturity of personality must, therefore, be regarded as something relative.

Personality Related to Anatomical Traits.—The question is frequently asked, "Can one's personality be determined from analysis of one's physical features?" "Do blondes have a different kind of personality than brunettes?" The answer to such questions deserves some attention, since the emphasis upon the relationship of behavior to organic structure may have led some readers to faulty conclusions.

There can be little doubt that one's anatomical features play an important rôle in determining personality. This topic has al-

ready been considered in terms of the manifestation of these anatomical features in abnormal degrees. The overly tall or overly short person tends to behave differently from the average by reason of his extreme stature. These differences are noticeable enough to make it apparent even to a person without specific training in personality analysis. Probably much the same thing is true of any other anatomical trait. It should be pointed out, however, that the unsuspecting person may easily be misled by the charlatan character analyst who flits from town to town reaping a financial harvest as the result of the gullibility of the uninformed. These character readers usually insist that they can and do analyze the personality of their subjects by means of such features as the color of hair and eyes, prominence of chin, height of forehead, distance between the eyes, facial lines, and a variety of other specific anatomical traits. It is possible that some of them really believe that their results are achieved in this manner, but most of their pronouncements are little better than mere guesses. Some of the success that such analysts sometimes have is only a matter of coincidence. For the rest, it is undoubtedly based upon shrewd observation, resulting from training and years of experience in interpreting the minimal responses that the subject makes in their presence.

Personality as Shown by Different Ways in Which One Behaves.—Instead of continuing to analyze behavior into the factors forming the topics of previous chapters, it will be worthwhile to think of the different aspects of one's personality as shown by the different ways in which one behaves as a person. This analysis does not attempt to break down behavior into its component parts; instead, it is a classification into a series of pictures of the individual's behavior when observed from different points of view. *In each case the picture is of a whole person behaving.*

When an attempt is made to classify these different ways of behaving, the same difficulties are encountered as have been met in segregating factors of behavior in the previous chapters. Therefore, any classification that may be employed must be rec-

ognized as a classification of convenience only. The one used here is not the only one that could have been used, but it will serve the purpose. It should further be pointed out that this classification is not the result of exhaustive analysis. Many additional habits which are important parts of personality should suggest themselves to the reader after examination of the ones here mentioned. In this analysis the various kinds of behavior are classified as motor, intellectual, emotional, socio-economic, and health habits. In many of the specific habits there will be overlapping. The part that each characteristic plays in the *whole* personality and the way in which that characteristic is related to others in the same personality is the important thing to note.

1. Motor Habits. There are many motor habits that are significant as personality traits and which contribute something important in distinguishing one personality from another. Only a few of these will be mentioned and these mainly by way of illustration. One's posture in walking, sitting, and standing contributes to one's personality as it is known to friends. By means of these significant habits it is often possible to recognize acquaintances at a distance too great to permit identification by means of facial features.

Many persons develop the use of specific gestures. In fact, some social groups, racial and otherwise, are often characterized by the extent to which these gestures play a part in their total behavior. The popular supposition that members of the Jewish race use their hands in a peculiar fashion while talking amounts almost to a belief that this trait is characteristic of that race. It is possible, of course, that Jews do use their hands more in talking than do other races, although it is very doubtful if this would constitute an important racial difference.

Closely akin to gestures are facial expressions. Individuals differ widely in what might be called expressiveness of facial responses. Some betray their thoughts and feelings very frequently by subtle changes in the responses of the facial muscles. At the other extreme, there are those who are sometimes called "poker faces." Some develop set habits of facial expressions for certain life situations. Others may develop a distinctly different

kind of habit for the same kind of situation. All such habits help to distinguish the personality of one person from another.

Vocal habits might well be mentioned along with these other motor responses. Particular characteristics of pitch and tone of voice as well as habitual peculiarities of enunciation and inflection readily distinguish certain acquaintances from others. Undoubtedly the characteristic habits involved in speech as a whole contribute significantly to what is regarded as one's personality.

2. Intellectual Habits. An amplification of the list of traits here mentioned and many illustrations of them will immediately be suggested to any thoughtful reader. One of these habits is open-mindedness, or, at the other extreme, closed-mindedness. Another intellectual trait fairly well distinguished from open- and closed-mindedness, but which is often confused with it, is immediately suggested by the pair of words, decisive and indecisive.

Persistence of individual effort in problem situations is another important trait of personality. Here again, a wide range is found among the members of any group. Its emotional accompaniments might warrant the classification of this trait under another heading. Attentiveness and keenness in observing important details is another outstanding personality trait. This is closely related to still another, that of maintaining a point of view throughout some of the complexities of diverse life situations, as, for example, in solving a problem. Not long ago the author was speaking with a student who had been reading arguments in support of several different and somewhat conflicting schools of psychology. The student said, "Every argument sounds so plausible that I am first a Behaviorist, then a Purposivist, then a Gestaltist, and I am limited in my points of view only by the number of the contending views presented. I am incapable of reading a defense of Purposivism and at the same time maintaining any other point of view." Probably a better illustration is the case of the college co-ed who allowed herself to be dated to a certain formal function by no less than four different college men. Each one of them seemed to her more attractive than the preceding ones, until she found herself in the dilemma of having to

explain to at least three men why she would not be able to accompany them.

One other intellectual trait should be maintained before leaving this topic. This is general modifiability or flexibility of habits of thinking and imagining. Some people think "in a groove." It was said of President Wilson by some of his opponents that he had a single-track mind. This trait will, of course, be recognized as being very much like the habit of maintaining a mind-set. A modification of this trait that is much encouraged by scientists is that of a questioning attitude, or of actually seeking more evidence before drawing a conclusion, instead of waiting passively for evidence to present itself.

The relationships of many of these traits to each other will have become obvious by this time. Some of the terms will seem to apply to the same behavior, but there are some important differences in each. This lack of preciseness in the definition of terms illustrates nicely one of the important difficulties involved in any analysis of personality. It is difficult to be certain that different persons who employ the same term are talking about the same thing. Also, it is important to note that the extremes of any of these traits are very likely to get one into personality difficulties, and hence contribute to difficulties of social adjustment.

3. Emotional Habits. The close relationship between intellectual habits and emotional habits has already been mentioned. In fact, one of the most significant things about emotional responses is that they are usually parts of larger patterns of behavior. Emotional habits may be thought of as those elements of behavior that contribute colorfulness and feeling tone to the whole behavior pattern.

Among these traits special attention should be given to the habit of making the emotional response appropriate to the life situation. Emotional control is one of the factors involved in this although control and appropriateness do not necessarily imply the same thing. The kind of man or woman whose personality is most annoying to his or her associates is the one whose emotional response is not appropriate to the situation arousing it. Such a one is described by a college student who, in complaining

about a roommate, said, "I never know whether she is going to be angry or not. Sometimes she gets very angry at what seem to me to be trifling incidents, and then again, when I fully expect her to be angry, she doesn't get angry at all. She may even laugh about the incident."

Associated with this personality trait is another having to do with general emotional responsiveness. Modern experimental medicine has suggested the dependence of emotional excitability upon the active functioning of certain of the endocrine glands. Important as the organic basis of this trait may be, due consideration must be given to the effect of habituation. In the case of either marked excess or marked deficiency of certain glandular secretions, the personality would be marked by corresponding excesses or deficiencies in the arousal of emotional responses. But not all such emotional differences can be accounted for in terms of glandular abnormalities. Training and habit formation undoubtedly play a very important part, particularly in the early formative years of childhood. Such cases may simply be instances of the sort of trait that runs in families and that is, at the same time, dependent more upon the social than upon the biological heritage of the individual.

4. Health Habits. Health habits have been included as a separate part of this classification because of their importance to the whole personality. Both physical and mental health should be considered. Consequently, the first personality trait to be mentioned will be that of recognizing and facing reality as it exists instead of submitting to an imaginary means of escape from unpleasant life situations.

Mental health and bodily health are so closely interrelated that it is difficult to distinguish the significance of the one type of health habit from the other. A certain man was known to the author for many years as one who rarely smiled and who almost never had been known to laugh. If it rained for three days in succession, he was gloomy and pessimistic about too much moisture. If the sun were to shine three days in succession, he would be equally downcast at the prospect of a drought. When he was without work for some time he was considerably downcast at

the prospect of living without an income, and when he had what would seem to be steady work, he worried for fear the work would soon end. His wife was an excellent cook, but the list of dishes that he could enjoy was so limited that the artistry of her cooking was largely lost upon him. He suffered a very great deal from indigestion, and it would be extremely difficult to determine whether the indigestion was the result of his worry or the worry the result of his indigestion. Quite aside from the matter of his health, however, his personality is such as to make it rather unpleasant to associate with him, and his friends were extremely few. His bodily health and his personality had both been definitely affected by his unhygienic mental health habits over a period of years.

Aside from habits that have reference essentially to mental health, it would be appropriate to note the importance of such specific habits as those related to bodily cleanliness, food preferences, and elimination. A sound, clean, healthy body is a great asset to any one's personality. Examination of the advertising in current magazines will furnish evidence of the general recognition of this fact. This advertising has probably caused a good deal of worry and concern to some persons who might have been better off without such opportunities to indulge their habits of worry. On the other hand, it has undoubtedly made many people conscious of bodily cleanliness, and may have done much to improve the development of habits conducive to personal health and wholesome personality.

5. Socio-Economic Habits. Very much of what is ordinarily meant by the term personality refers to that part of one's total behavior which is evident in social situations. Broadly speaking, therefore, any habitual pattern of behavior having to do with the way a person responds to others of his social group might be called a social personality trait. In this category are found pairs of words designating the opposite extremes of certain habitual modes of behavior. Ascendancy-submission behavior refers to the varying degrees of the tendency to be either submissive to the commands and suggestions of others or to be assertive and dominating in such behavior. A casual examina-

tion of one's circle of acquaintances will provide illustrations of varying degrees of such a trait.

There is also a group of generalized terms used to designate certain habitual modes of behavior such as honesty, dependableness, and responsibleness. Each of these describes a complex group of habits which differ in many details though all have certain characteristics in common. This point if often overlooked in applying the generalized term to a specific kind of response. A man may be absolutely honest in matters pertaining to his neighbor's property, but this would not necessarily imply that he is equally honest in the matter of his neighbor's reputation. In making a complete analysis of any personality, it would therefore seem to be necessary to break down such general terms as honesty in order that the more specific phases of this general trait may be determined. Other traits of this kind are neatness, sociability, variability, and cooperativeness.

On the other hand there are some much more specific social habits that reflect one's personality and greatly influence responses of the person-to-person type. A few years ago Laird published a little book entitled, *Why We Don't Like People.*[1] In this he presents the results of an analysis of some of the traits that make some people liked and some disliked. Perhaps it might be well to cite his list of nine habits which have the greatest influence in determining whether a person will be liked or disliked. They are, in the order in which he lists them, as follows:

1. Be depended upon to do what you say you will do.
2. Go out of your way to help others.
3. Do not show off your knowledge.
4. Do not let yourself feel superior to your associates, and be careful lest they get the impression that you do.
5. Do not reprimand people who do things that displease you.
6. Do not exaggerate in your statements.
7. Do not make fun of others behind their backs.
8. Do not be sarcastic.
9. Do not be domineering.

[1] D. A. Laird, *Why We Don't Like People,* New York, A. L. Glaser & Co., Inc., 1933.

Laird lists other traits of lesser significance which might be considered to advantage by the person who is anxious to be better liked by other people. A check-list compiled by Laird for evaluating your own likableness will be found at the end of this chapter.

Most of the traits that have been mentioned are definitely on the social rather than on the economic side, although, of course, one's economic status is often dependent upon some of the social traits already mentioned. Certain economic personality traits that seem to be the result of habituation have come to be identified with certain nationalities. The old facetious definition of an optimist as a "man who would buy from a Jew and sell to a Scot and expect to make a profit on both ends," makes definite reference to the assumed personality traits of these two nationalities. The difficulty of trying to separate the economic factors from the social ones is so great as to make the distinction not worth while in ordinary circumstances. In the case just mentioned, it would be difficult to determine whether the factors were essentially economic or essentially social if, as a matter of fact, they actually do exist as racial characteristics.

The Integration of Personality.—The fact is worth emphasizing that many of the traits mentioned are groups of habits which have enough of a common element to give them a common classification. So long as one's habits contribute to the unity and distinctness of one's individuality, one will under ordinary circumstances be regarded as having a satisfactorily *integrated* personality. The word "integrate" literally means "to make one" or "to bring together into a whole." The integrated personality, therefore, is one in which the various habits are related or brought together in such a way that each contributes to the whole personality.

Sometimes one's habits are not compatible with each other. In such cases there may be interference of the habits to the point where the personality disintegrates. It may then become a split personality such as that depicted in the famous story of Dr. Jekyll and Mr. Hyde. It is not the fact that in one of its phases it is so socially reprehensible that causes a split personality to be regarded

as unwholesome. Other cases of split personality, of actual medical record, do not involve such socially undesirable behavior. It is the distintegration that is more important than the nature of the two warring groups of personality traits themselves.

On the other hand, a personality may be very well integrated and still be socially undesirable. In such a case the whole pattern of habits tends to center around characteristics that are socially unpleasant and sometimes even socially menacing. A fictional character that nicely illustrates such unpleasantness is Scrooge, as depicted by Dickens in the *Christmas Carol.* Silas Marner is another example of an integrated personality that was not a socially desirable one during the time of his miserliness.

Integration, then, is a matter of mental good health, and the process of reintegrating traits of a personality which shows signs of disintegrating is one of the very frequent tasks of the psychiatrist. Usually the remedial measures consist essentially of rehabituation. This is the process of changing some of the patient's habits to make them more compatible with each other and more acceptable to the social groups of which the patient is a part. In this process the particular habits that are causing the difficulty are discovered by careful diagnosis of the patient's total behavior, and the offending habits are then made the special object of retraining.

What, Then, is Personality?—So far, much of this discussion of personality has seemingly continued the process of analysis which characterized the previous chapters. In spite of this, however, it is possible now to begin to distinguish that important factor called integration. Considered from all angles, personality is that which characterizes the individual and distinguishes him from others of his species. It is the sum total of all his behavior traits as a person, and in addition, it involves the relationship of these traits to each other when the person's behavior is considered as a whole. Any process of determining personality that depends solely upon analysis of traits will be found to give an inadequate picture. It then becomes apparent that any changes in personality which are to be made must be effected in one of two ways. Either

the specific traits involved must be modified, or else the relationships between the respective traits as they exist must be altered.

Process of Changing One's Personality.—Can one's personality be changed, and if so, how can it be done? The answer to the first part of this question seems to be that undoubtedly personality can be changed within certain limits. These limits are twofold in nature. In the first place, the proposed changes must be within the limits determined by the biological inheritance. In the second place, they must fall within the limits that can result from changing the stimulating environment. In other words, the only way of changing a person's behavior is by changing some significant aspect of his environment in order that his habits may thereby be modified.

The second part of the question is more complex. First of all, the offending trait or traits must be discovered. In doing this, careful self-analysis in as unprejudiced a manner as possible may be a convenient starting place. It often happens that a man or woman recognizes that his or her personality is not satisfactory, that it is resulting in the dislike of too many people. In viewing personality as a whole the task seems so hopelessly large as to be discouraging. Most people do not know specifically which are the things that cause their personalities to be socially unsatisfactory.

The chief difficulty often lies in finding out which are the offending habits, and it is in these cases that the findings of such workers as Laird are particularly useful. If only the offending habits can be discovered, the sufferer is already well on his way to recovery. From this point the process is essentially one of habit formation. The conditions of learning, as discussed in a previous chapter, will be the best aids in establishing the new habits to replace the old.

The motivation necessary for carrying through the process of rehabituation is usually provided by the intense desire to be better liked. In the absence of such a motivating force, it is first necessary to obtain the active cooperation of the learner.

A case of this sort has been reported by Laird:

A certain boy turned out by his own rating to have the worst score in the collection. Now it happened that this boy possessed, in spite of that, numerous advantages and talents which would seem to make it comparatively easy for him to be liked. He had wealth and social accomplishments, dressed well, played the piano like a wizard, and was good as an amateur in several popular forms of athletics. All to no avail. By the admission of all the other students in the group who knew him, as well as by his own description of himself, he was shown to be the most disliked.

For sixteen months he had been in close contact with a group of about fifteen boys of his own age. For sixteen months, in the manner of boys, they had been telling him that he was "all wet," and that he was a "pain in the neck." He knew well enough that he was disliked, but he honestly did not know why. The analysis which he made for himself in ten minutes in the laboratory pointed out definite traits as the reasons why he was disliked. Thus, in place of a vague realization of his misfortune he secured a diagram of the weak points which were to blame and which he knew he must correct.

Two weeks after this boy had made his self-analysis, one of the others of his group was working for me for a few hours. In the course of conversation, he remarked, "Say, what did you do to Smithers? We have razzed him and been after him continually for almost two years now, and here something happened up in the laboratory—I don't know what, whether it was serum or an injection of horse sense, but he is a changed fellow. We are beginning to like him immensely."

One of the traits of this boy had been showing off his knowledge. He never spoke of salt except as sodium chloride, partly in fun but also with an underlying desire of displaying his learning. Another trait was the habit of trying to get others to do things for him. He had the reputation of buying one package of cigarettes a month and smoking two packages a day. The analysis had pointed out traits like these which even the boys who disliked him did not realize were the cause of their dislike.[2]

It is often necessary to know how these habits came to be formed since this makes it possible to know what changes in the environment will have to be made to change the habit. By follow-

[2] Laird, *op. cit.*, pp. 27–28.

ing the conditioned response procedure described in the chapter on emotions, environmental situations can often be so arranged that the desired reconditioning can be effected. It is exactly the process employed by Watson and Jones in reconditioning the fear response of the boy to the rabbit. It would be advantageous at this point to review this experiment as recounted in the chapter on emotions.

Objective Attitude as a Desirable Personality Trait.—The objective attitude may best be understood by contrasting it with the subjective attitude. The latter is concerned chiefly with feelings, emotions, and other personal experiences. In contrast to this, the objective attitude is mostly concerned with those things which lie outside of oneself, and enables men and women to consider themselves in an impersonal way. The objective attitude is illustrated by the scientist in his own laboratory, by the merchant as he deals with the customer, and by the farmer as he plans his rotation of crops. Of course, in each of these situations there is also room for some degree of the subjective attitude. The scientist or merchant or farmer normally may be expected to have something of a glow of pride in his own possession and his own work. The wholesome personality represents a balance between the extremes.

The question naturally arises: How is the objective attitude to be developed? The key to the answer is found in the normal development of human beings through childhood into adult life. Children are essentially egocentric in the early years of infancy and childhood. This gradually gives way to a point of view in which one is able to see oneself as a member of a social group. This is usually brought about by the incidental and normal activities of life by means of which one is made to assume larger social responsibilities. If one is to live satisfactorily with others, one must learn to see things from the other person's point of view. Consequently, for the adult who is lacking in an objective attitude, the suggested means of attaining it might very well be that of learning to see things connected with oneself from the point of view of others.

An Outline Summary

1. Difficulties in dealing with the problems of personality.
   - A. The sum of all the separate traits which result from an analysis of a personality fails to give an adequate representation of that personality because,
     - (a) The traits themselves are so complex as to make it difficult to analyze them or to classify them properly, and
     - (b) The relationships between the separate traits are themselves important determining factors in any personality.
   - B. Knowledge of the various factors of behavior gained from a study of each one by itself in the previous chapters must be reassembled in such a manner as to show the way in which each factor influences and is influenced by each other factor. One convenient way of doing this is by a classification of the behavior of a person into habitual responses. The more important of these for the understanding of a personality are:
     - (a) Motor habits,
     - (b) Intellectual habits,
     - (c) Emotional habits,
     - (d) Health habits, and
     - (e) Socio-economic habits.
2. Characteristics of an integrated personality.
   - A. The several habitual tendencies toward response are mutually compatible, showing no important conflict in general life situations.
   - B. A well-integrated personality may be either socially desirable or socially undesirable depending upon the social acceptableness of the dominant trend of the integration.
3. Personality can be changed by:
   - A. Changing one or more of the separate habitual responses that are involved in the personality as a whole, or by
   - B. Changing the significant relationships as they exist between the dominant responses without important changes in the habitual responses themselves.

Problems for Further Thought

1. Many people are dismayed and distressed to find themselves so much disliked. Being at a loss to know why they are disliked, they are powerless to do anything to remedy the matter. Laird in his book, *Why We Don't Like People,* devotes two chapters to this problem. Below is a list of 45 questions taken from that book, and Laird's suggestions about scoring the answers. Remember that the value of this exercise to you lies in the fact that this inventory will help you take stock of yourself. Hence it is important that you maintain an objective attitude toward your own behavior if the results are to be of any value.

Traits Which Make Us Liked

Give yourself a score of 3 for each of these questions to which you can honestly answer "Yes":

(1) Can you always be depended upon to do what you say you will?
(2) Do you go out of your way cheerfully to help others?
(3) Do you avoid exaggeration in all your statements?
(4) Do you avoid being sarcastic?
(5) Do you refrain from showing off how much you know?
(6) Do you feel inferior to most of your associates?
(7) Do you refrain from bossing people not employed by you?
(8) Do you keep from reprimanding people who do things that displease you?
(9) Do you avoid making fun of others behind their backs?
(10) Do you keep from domineering others?

Give yourself a score of 2 for each of these questions you can answer "Yes":

(11) Do you keep your clothing neat and tidy?
(12) Do you avoid being bold and nervy?
(13) Do you avoid laughing at the mistakes of others?
(14) Is your attitude toward the opposite sex free from vulgarity?
(15) Do you avoid finding fault with everyday things?
(16) Do you let the mistakes of others pass without correcting them?
(17) Do you loan things to others readily?

(18) Are you careful not to tell jokes that will embarrass those listening?
(19) Do you let others have their own way?
(20) Do you always control your temper?
(21) Do you keep out of arguments?
(22) Do you smile pleasantly?
(23) Do you avoid talking almost continuously?
(24) Do you keep your nose entirely out of other people's business?

Give yourself a score of 1 for each of these questions you can answer "Yes":

(25) Do you have patience with modern ideas?
(26) Do you avoid flattering others?
(27) Do you avoid gossiping?
(28) Do you refrain from asking people to repeat what they have just said?
(29) Do you avoid asking questions in keeping up a conversation?
(30) Do you avoid asking favors of others?
(31) Do you avoid trying to reform others?
(32) Do you keep your personal troubles to yourself?
(33) Are you natural rather than dignified?
(34) Are you usually cheerful?
(35) Are you conservative in politics?
(36) Are you enthusiastic rather than lethargic?
(37) Do you pronounce words correctly?
(38) Do you look upon others without suspicion?
(39) Do you avoid being lazy?
(40) Do you avoid borrowing things?
(41) Do you refrain from telling people their moral duty?
(42) Do you avoid trying to convert people to your beliefs?
(43) Do you avoid talking rapidly?
(44) Do you avoid laughing loudly?
(45) Do you avoid making fun of people to their faces?

"The higher your score by this self-analysis the better liked you are in general. Each 'No' answer should be changed through self-guidance into a 'Yes' answer. The highest possible score is 81. About 10% of people have this score. The lowest score made by a

person who was generally liked was 56. The average young person has a score of 64. The average score of a person who is generally disliked is 30. The lowest score found was 12." [3]

2. In Wiggam's book, *Exploring Your Mind with the Psychologists* (listed below), are two chapters of an interview with Adams which deal with the problems of judging ourselves and our fellows. Adams sets up an easy and interesting technique by means of which a group of any nine individuals who know each other very well can get fairly reliable analyses of their personality on the basis of 63 traits. For more extended analysis than that provided in the problem above, this will serve the purpose. It will be necessary to have at least one copy of the book.

3. Below is a list of 20 questions that are to be answered with "Yes" or "No." They are designed to measure your ability to be objective in your attitude as that attitude has been discussed. Put your answers on an unsigned sheet. Let these be collected and the average number of affirmative answers be computed for the class. Then compare your own score with this class average. In addition, let the committee compute the number of affirmative answers for each question. This will enable you to compare yourself in terms of the class replies. No large-scale norms are available, nor is it known whether sex and age make any difference in the results.

Directions: Here is a list of questions to be answered by either "Yes" or "No." Think of situations from your own experience but try to get as honest an estimate as possible of the average of the situations represented by the questions. There is no time limit but nothing is gained by overmuch study of the questions. Do not sign your name to the slip you hand to the committee that will compile results, but keep a copy of your answers for use in making your own comparisons later.

_____ (1) Can you accept philosophically the destruction of a treasured keepsake? (not "weeping over spilt milk").

_____ (2) When you do things for the pleasure of others do you recognize your own gain in so doing?

_____ (3) Are you able readily to recognize and assume responsibility for failure in a group enterprise in so far as you have, in reality, been to blame?

[3] Laird, *op. cit.*, pp. 30-32.

_____ (4) Do you regularly avoid putting the blame on the cards or on the referee, when you lose a card game or an athletic contest?

_____ (5) Do you evaluate the praise you receive for that which you have done well, even when you may behave with modesty?

_____ (6) Do you recognize the motives for your own acts even when you keep them hidden from others?

_____ (7) Does your estimate of your own ability agree substantially (not much higher or lower) with the estimate of those who know you well?

_____ (8) Can you cheerfully adjust your manner of living to meet a loss of a sum of money or a job, without playing for the condolences and sympathy of your friends?

_____ (9) Can you recognize what justice there actually may be in the voiced criticism of your behavior without rationalization on your part?

_____(10) Can you fail to get the grade in a course that you have expected, without putting the blame on the course or the instructor?

_____(11) When you are being cajoled or urged to act contrary to your best interest, in the name of friendship, do you usually recognize the motives of those urging you?

_____(12) Do you allow yourself to be persuaded to act as you desire to act, against your better judgment?

_____(13) Do you go to shows when you know there is important pressing work to be done?

_____(14) Can you recognize a considerable degree of justice in the criticism of those who know you well, when these criticisms are made in a keen but friendly manner?

_____(15) Do you avoid prolonged mourning at the loss of loved ones or of very dear friendships, even though you miss them very much?

_____(16) Do you avoid a sour grapes or a sweet lemon attitude when you fail to establish a friendship or fail to attain a reward which you wish very much?

_____(17) Do you usually refuse to take credit which is attributed to you but which you *honestly* believe you do not deserve?

_____(18) Do you usually refuse to buy things which you very much want but which you know you could not afford?

_____(19) Can you usually avoid thinking that your opponents are unfair when their arguments are more logical than your own?

_____(20) Do you usually recognize the true cause of an extreme lack of energy when there is not a sufficient organic basis for such fatigue?

Suggested Readings

Berg, Louis. The Human Personality. New York, Prentice-Hall, Inc., 1933. Ch. I, "Personality and the Body," pp. 1–12. Other chapters will be of interest as collateral reading for special topics.

Bowers, E. F. Charm and Personality—How to Attain Them. New York, National Library Press, 1934.

Burnham, W. N. The Wholesome Personality. New York, D. Appleton-Century Co., 1932. Among the many parts of this book that are related to the whole problem of personality adjustment, the following are cited especially: Ch. I, "The Background of Personality," pp. 1–27; Ch. III, "Other Factors of Personality," pp. 53–83; Ch. VI, "The Wholesome Personality," pp. 176–220; Ch. VII, "The Objective Attitude."

Hawkes, E. W., and Johns, R. L. Orientation for College Freshmen. New York, The Ronald Press Co., 1929. Ch. XVII, "Personality and Character," pp. 192–203.

Laird, D. A. Why We Don't Like People. New York, A. L. Glaser & Co., 1933. Ch. I, "People We Like," pp. 3–14; Ch. II, "Why We Like Some People and Don't Like Others," pp. 15–32; Ch. XII, "Look to Your Personality," pp. 178–198. Several other chapters are pertinent also. This is interesting and easy reading for the non-professional reader.

Valentine, P. F. The Psychology of Personality. New York, D. Appleton-Century Co., 1927. A systematic textual discussion of the problems of personality.

Wiggam, E. A. Exploring Your Mind with the Psychologists. New York, Bobbs-Merrill Co., 1928. Ch. IV, by D. A. Laird, "How to Make an Inventory of Our Personality," pp. 61–85; Chs. V and VI, by H. F. Adams, "How We Judge Ourselves and Fellow Men," pp. 89–123.

Wright, Milton. Getting Along with People. New York, McGraw-Hill Book Co., Inc., 1935. This recent book is written in a popular and easy manner. It will be found to be interesting collateral reading and factually important.

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